



COMDTINST M3502.11A
AUG 16 1993

COMMANDANT INSTRUCTION M3502.11A

Subj: ENGINEER OFFICER IN TRAINING (EOIT) PROGRAM PERSONNEL
QUALIFICATION STANDARD

1. PURPOSE. This manual provides guidance for officers assigned to the EOIT program.
2. ACTION. Area and district commanders and commanders of maintenance and logistic commands shall insure that the provisions of this manual are followed in conducting afloat training and qualification programs.
3. DIRECTIVES AFFECTED.
 - a. COMDTINST M3502.11, Personnel Qualification Standard Student Engineer is cancelled.
 - b. COMDTINST M3502.4C, Cutter Training and Qualification Manual.
4. DESCRIPTION. The primary goal of the EOIT program is to train officers for duty as Engineer Officers (EO) afloat. The program is generic to all cutter classes and shall be administered in conjunction with a unit's Engineer Officer of the Watch (EOW) qualification process. It is the responsibility of the unit's EO to insure the EOIT is well versed in all aspects of the curriculum herein.

4. (cont'd)

Completion of this program provides an officer with an excellent foundation for future assignments in technical, logistical, and operational specialties. The EOIT program is divided into seven parts. All but Part 6 must be completed prior to assignment as EO afloat. Currently, this requirement does not apply to warrant officers or warrant officers selected to lieutenant and assigned as EO. However, plans have been initiated to adopt the EOIT qualification program (tailored to respective naval engineering backgrounds) for warrants, prior enlisted OCS graduates, and warrant officers selected to lieutenant.

- a. PART 1 - Practical Naval Engineering Watch Qualifications and Damage Control Personnel Qualification Standard (PQS).
- b. PART 2 - Damage Control Assistant (DCA) School.
- c. PART 3 - Naval Engineering Division Officer Fundamentals.
- d. PART 4 - Deck Watch Officer (DWO) Training.
- e. PART 5 - Naval Engineering Organization, Policy and Procedures.
- f. PART 6 - Technical and Contracting Schools.
- g. PART 7 - Prospective Engineer Officer (PEO) Training Refresher Course.

5. PROCEDURES AND DETAILS.

- a. PART 1 - Practical Naval Engineering Watch Qualifications and Damage Control PQS should normally be completed within 6 months of reporting aboard. Assignment as EOIT is an officer's primary duty. Due to the demanding nature of this program, non-engineering collateral duty assignments shall be minimized until completion of Part 1. Upon completion of Part 1, the EO shall evaluate the EOIT's technical aptitude for further training. If an officer does not wish to remain in the program, or if the EO recommends that the officer should not be permitted to continue in the program, the Commanding Officer shall initiate a letter to Commandant (G-PO) so indicating. G-PO will usually reassign the officer as the needs of the service require.

5. a. (1) The EOIT shall:
 - (a) Actively pursue and complete the course of study outlined herein, and continuously seek feedback from the EO regarding progress.
 - (b) Establish and maintain an EOIT Notebook that documents the completion of Parts 1-7.
 - (c) Qualify as an EOW. Until qualified, he/she shall stand underway and inport watches with a qualified EOW as directed by the EO and the unit's break-in watch rotation standards. Watchstanding (learning by experience) is the backbone of the EOIT Program. As general guidance, an EOIT should stand break-in watches at least 2 days per week inport and optimize the time available to stand watches while underway.
 - (d) As directed by the EO, work as a member of the main propulsion, auxiliary, electrical, and damage control divisions.
 - (e) As directed by the EO, participate in engineering plant start ups, shut downs, and special evolutions until qualified as an EOW.
- (2) The EO shall:
 - (a) Brief the Engineering Department on their role in the EOIT program. Solicit input from chief/senior petty officers regarding the EOIT's technical aptitude and interpersonal skills demonstrated while working closely with enlisted personnel.
 - (b) Actively, supervise, instruct, and provide frequent feedback to the EOIT.
 - (c) Conduct counselling sessions at least once per month to review the EOIT's notebook and evaluate his/her progress.
 - (d) Keep the Commanding Officer informed of the EOIT's status throughout the program.
- b. Part 2 - DCA School. Completion of Part 1 is normally a prerequisite for attending DCA School. Officers shall not be assigned to the position of DCA without having successfully completed DCA School.

5. c. PART 3 - Naval Engineering Division Officer Fundamentals. The emphasis of Part 3 is to develop the knowledge and skills to serve in the capacity of an Engineering Department Division Officer and to sharpen EOW skills acquired in Part 1.
 - (1) The EOIT shall:
 - (a) Be assigned (at the EO's discretion) and serve in the capacity of an Engineering Department Division Officer.
 - (b) Serve as a member of the EOW watch rotation.
 - (c) Continue to seek feedback from the EO.
 - (2) The EO shall:
 - (a) Continue to supervise, instruct, and provide frequent feedback to the EOIT.
 - (b) Continue counselling sessions at least once per month to review the EOIT's notebook and evaluate his/her progress.
- d. PART 4 - Deck Watch Officer (DWO) Training. Procedures for completing Part "4" are outlined in Chapter 6 of COMDTINST M3502.4C, Cutter Training and Qualification Manual.
 - (1) Parts 1 - 4 shall be completed during the EOIT's first afloat tour (18 - 24 months). Upon completion of Parts 1 - 4, the Commanding Officers shall submit a letter to Commandant (G-PO) stating the officer's overall capabilities, interest, and engineering aptitude. A sample completion letter appears in the appendix to this manual.
- e. PART 5 - Naval Engineering Organization, Policy and Procedures. Part 5 may be completed during the initial afloat tour or follow on tour. A second qualification letter shall be submitted to Commandant (G-PO) verifying the completion of Part 5. A sample completion letter appears in the appendix to this manual.
- f. PART 6 - Technical and Contracting Schools. Technical and contracting courses outlined in Part 6 shall be completed as required by the EOIT's follow on tour Billet Description (i.e. NESU training billet, MLC staff assignment, etc.). Completion of these courses shall be documented on Form CG-4082, Officer Educational Record, and entered into the Officer's Personnel Record.

5. g. PART 7 - Prospective Engineer Officer (PEO) Training Refresher Course. To be developed per enclosed charter. Upon completion of the PEO curriculum, it will become required pipeline training for all officers assigned as EO afloat.
6. EFFECTIVE. Parts 1 - 6 become effective with EOITs entering the program during Summer 1993; however, for officers' who have substantially completed Part A to COMDTINST M3502.11 upon receipt of this instruction, completion of Part 1 is waived. Part 7 becomes effective with EOs assigned during Summer 1994. Amplifying information is contained in Chapter 6 of COMDTINST M3502.4C, Cutter Training and Educationm Manual.
7. CHANGES. Changes to this manual will be issued by Commandant (G-ENE). Recommendations for improvements to this manual should be submitted via the chain of command.

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Chief, Office of Engineering, Logistics
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Encl: (1) COMDTINST M3502.11A

LIST OF REFERENCES

Naval Engineering Manual, COMDTINST M9000.96(Series)

Personnel Manual, COMDTINST M1000.6(Series)

PMIS/JUMPS Manual Vol I, COMDTINST M1080.7(Series)

Training and Education Manual, COMDTINST M1500.10(Series)

Medals and Awards Manual, COMDTINST M1650.25(Series)

Cutter Training and Qualification Manual, COMDTINST M3502.4(Series)

Shipboard - Helicopter Operational Procedures Manual, COMDTINST M3710.2(Series)

Small Purchase Handbook, COMDTINST M4200.13(Series)

Supply Policy and Procedures Manual, COMDTINST M4400.19(Series)

Unit Safety and Occupational Health Program, COMDTINST 5100.44(Series)

Standard Subject Identification Codes (SSIC) Manual, COMDTINST M5210.5(Series)

Correspondence Manual, COMDTINST M5216.4(Series)

Safety and Environmental Health Manual, COMDTINST M6260.2(Series)

Vessel Safety Quick reference Guide, COMDTPUB P5100.51

Directives, Publications and Reports Index, COMDTNOTE 5600

NWP 10-1-10, Operational Reports

Afloat Supply Procedures Manual, NAVPUB 485

Afloat Shopping Guide, NAVSUP 4400

MK3 Correspondence Course

MK2 Correspondence Course

Blueprint Reading and Sketching, NAVEDTRA 10077

Fireman, NAVEDTRA 10520

Engineman 3 & 2, NAVEDTRA 10541

Electrician's Mate 3 & 2, NAVEDTRA 10546

Gas Turbine System Technician 3 & 2 (Mechanical), NAVEDTRA 10548

Gas Turbine System Technician 3 & 2 (Electrical), NAVEDTRA 10550

IC Electrician 3, NAVEDTRA 10559

Hull Maintenance and Technician 3 & 2, NAVEDTRA 10571

Principles of Naval Engineering, NAVEDTRA 10788

Naval Safety Supervisor, NAVEDTRA 10808

Fluid Power, NAVEDTRA 12964

NSTM Chapter 001, General-NSTM Publications Index and User Guide

NSTM Chapter 074 (Vol1), Welding and Allied Processes

NSTM Chapter 074 (Vol2), Nondestructive Testing of Metals, Qualification and Certification Requirements for Naval Personnel

NSTM Chapter 074 (Vol3), Gas Free Engineering

NSTM Chapter 075, Threaded Fasteners

NSTM Chapter 077, Personnel Protection Equipment

NSTM Chapter 078, Gaskets, Packings and Seals

NSTM Chapter 079 (Vol1), Damage Control-Stability and Buoyancy

NSTM Chapter 079 (Vol2), Damage Control-Practical Damage Control

NSTM Chapter 079 (Vol3), Damage Control-Engineering Casualty Control

NSTM Chapter 100, Hull Structures

NSTM Chapter 220 (Vol1), Boiler Water/Feedwater-Water Chemistry

NSTM Chapter 220 (Vol2), Boiler Water/Feedwater-Test and Treatment

NSTM Chapter 221, Boilers

NSTM Chapter 233, Diesels Engines

NSTM Chapter 235, Electric Propulsion Installations

NSTM Chapter 234, Marine Gas Turbines

NSTM Chapter 244, Bearings

NSTM Chapter 245, Propellers

NSTM Chapter 252, Ship Control Equipment

NSTM Chapter 254, Condenser, Heat Exchangers and Air Ejectors

NSTM Chapter 255 (Vol1), Feedwater System and Apparatus, Feed and Condensate Systems

NSTM Chapter 255 (Vol2), Feedwater System and Apparatus, Deaerating Feed Tank

NSTM Chapter 262, Lubricating Oils, Greases, Hydraulic Fluids and Lubricating Systems

NSTM Chapter 300, Electric Plant General

NSTM Chapter 302, Electric Motors and Controllers

NSTM Chapter 310, Electric Power Generators and Conversion Equipment

NSTM Chapter 313, Portable Storage and Dry Batteries

NSTM Chapter 320, Electric Power Distribution Systems

NSTM Chapter 330, Lighting

NSTM Chapter 400, Electronics

NSTM Chapter 422, Navigation and Signal Lights

NSTM Chapter 430, Interior Communication Installations

NSTM Chapter 470, Shipboard BW/CW Defense and Countermeasures

NSTM Chapter 475, Magnetic Silencing

NSTM Chapter 491, Electrical Measuring and Test Instruments

NSTM Chapter 503, Pumps

NSTM Chapter 504, Pressure, Temperature and Other mechanical and Electromechanical Measuring Instruments

NSTM Chapter 505, Piping Systems

NSTM Chapter 510, Ventilating, Heating, Cooling and Air Conditioning Systems for Surface Ships

NSTM Chapter 512, Fans

NSTM Chapter 516, Refrigeration Systems

NSTM Chapter 531 (Vol1), Desalination Low-Pressure Distilling Plants

NSTM Chapter 531 (Vol2), Desalination Vapor Compression Distilling Plants

NSTM Chapter 531 (Vol3), Desalination Reverse Osmosis Desalination Plants

NSTM Chapter 532, Liquid Cooling Systems for Electronic Equipment

NSTM Chapter 533, Potable Water Systems

NSTM Chapter 541, Petroleum Fuel Storage, Use and Testing

NSTM Chapter 542, Gasoline and JP-5 Fuel Systems

NSTM Chapter 550, Industrial Gases; Generating Handling and Storage

NSTM Chapter 551, Compressed Air Plants and Systems

NSTM Chapter 554, Forced Draft Blowers

NSTM Chapter 555, Firefighting Ship

NSTM Chapter 556, Hydraulic Equipment (Power Transmission and Control)

NSTM Chapter 562, Surface Ship Steering Systems

NSTM Chapter 571, Underway Replenishment

NSTM Chapter 572, Shipboard Stores and Provision Handling

NSTM Chapter 573, Booms

NSTM Chapter 581, Anchors and Anchoring

NSTM Chapter 582, Mooring and Towing

NSTM Chapter 583, Boats and Small Craft

NSTM Chapter 589, Cranes

NSTM Chapter 593, Pollution Control

NSTM Chapter 604, Locks, Keys and Hasps

NSTM Chapter 611, Fenders

NSTM Chapter 613, Wire, Fiber Rope and Rigging

NSTM Chapter 631, Preservation of Ships (Surface Preparation and Painting)

NSTM Chapter 633, Cathodic Protection

NSTM Chapter 634, Deck Coverings

NSTM Chapter 635, Thermal, Fire and Acoustic Insulation

NSTM Chapter 655, Laundry

NSTM Chapter 670, Stowage Handling, and Disposal of Hazard General Use Consumables

NSTM Chapter 700, Shipboard Ammunition Handling and Stowage

NSTM Chapter 772, Cargo and Weapons Elevators

NSTM Chapter 997, Docking Instructions and Routine Work in Dry Dock

NSTM Chapter 9120, Hull Fittings, Lashing Gear and Access Closures

NSTM Chapter 9340, Commissary Equipment

NSTM Chapter 9420, Propulsion Reduction Gears, Couplings, and Associated Components

NSTM Chapter 9430, Shafting, Bearings and Seals

NSTM Chapter 9880, Damage Control: Compartment Testing And Inspection

MLCP / MLCA Standing and Operating Procedures

Damage Control Book

Manufacturers' Technical Publications

Cutter Organization and Regulations Manual

Cutter Information Books

Cutter Casualty Control Manual

Cutter Drawings

Engineering Department Organization and Regulations Manual

Repair Party Manual

Master Training Plan (TQC)

EOIT PERSONNEL QUALIFICATION STANDARD

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PART I

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. Principles of Naval Engineering, NAVEDTRA 10788
3. Fireman, NAVEDTRA 10520
4. Applicable NSTM Chapters; refer to Chapter 001, Publications Index
5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Describe the mechanical makeup and explain the basic principles of operation and common use of the following valves. Identify the respective blue print symbology for each.

- | | |
|---------------------------------|-------------------------------|
| 1. Globe | 8. Relief |
| 2. Gate | 9. Pilot Controlled air |
| 3. Check(Lift, Ball, Swing) | 10. Directional control valve |
| 4. Plug | 11. Needle |
| 5. Pressure reducing/regulating | 12. Butterfly |
| 6. Thermostatically controlled | 13. Ball |
| 7. Orifice | 14. Safety |

C. Describe the mechanical makeup and explain the basic principles of operation and common use of the following instruments.

- | | |
|--------------------|---------------------------------------|
| 1. Pressure gauges | 6. Liquid level indicators |
| 2. Vacuum gauges | 7. Fluid flow meters |
| 3. Compound gauges | 8. Revolution counters and indicators |
| 4. Thermometers | |
| 5. Pyrometers | |

D. Describe the mechanical makeup of the following types of steam traps.

- | | |
|-----------------------------|-----------------|
| 1. Mechanical [Ball/Bucket] | 2. Thermostatic |
|-----------------------------|-----------------|

E. Describe the mechanical makeup, and explain the principles of operation and uses of the following.

- | | |
|------------------------------|----------------------------|
| 1. Speed-limiting governor | 3. Constant-speed governor |
| 2. Automatic shutdown device | |

F. State how the following pumps move fluids; are they positive or non-positive displacement type?

- | | |
|------------------|--------------|
| 1. Reciprocating | 6. Jet |
| 2. Rotary | 7. Propeller |
| 3. Centrifugal | 8. Screw |
| 4. Gear | 9. Vane |
| 5. Axial Piston | |

G. Define the following as applied to pumps.

- | | |
|------------------------------|--------------------------|
| 1. Power end/Fluid end | 6. Capacity |
| 2. Aeration | 7. Positive Displacement |
| 3. Net positive suction head | 8. Packing |
| 4. Cavitation | 9. Lantern Ring |
| 5. Suction/Discharge Head | 10. Mechanical Seal |

H. Define the following engineering terms.

- | | |
|-----------------------------|-----------------------|
| 1. Light off/Start up | 20. Sensible heat |
| 2. Cross-connect | 21. Latent heat |
| 3. Standby | 22. Cut in |
| 4. Press Up | 23. Cut out |
| 5. Absolute Pressure (psia) | 24. Settle out |
| 6. Gauge pressure (psig) | 25. Viscosity |
| 7. Bypass | 26. On the line (OTL) |
| 8. Cold iron | 27. Kinetic energy |
| 9. Condensation | 28. Potential energy |
| 10. Vaporization | 29. Celsius scale |
| 11. Start | 30. Fahrenheit scale |
| 12. Secure | 31. Dew point |
| 13. Circulation/recirc | 32. Line up |
| 14. Warm up | 33. Auxiliary |
| 15. Blowdown | 34. Balance |
| 16. Overtorque | 35. Come Along |
| 17. Priming | 36. Horse Power |
| 18. Shaft Horse Power | 37. Brake Horse Power |
| 19. OOC | |

I. Identify the basic applications of heat exchangers.

J. State the function of the following safety devices.

- | | |
|---------------------------|----------------------------|
| 1. Overspeed trip | 5. Emergency hand trip |
| 2. Back-pressure trip | 6. Speed-limiting governor |
| 3. Low oil pressure trip | 7. Interlocks |
| 4. Thermal Overload Relay | |

K. State the purpose of gears in terms of changing speed, direction, and torque of shafts.

L. State the purpose of the shaft turning gear.

- M. How do the following factors contribute to or reduce the efficient and economical operation of the engineering plant?
1. Clean heat exchanger surfaces.
 2. Overloaded and underloaded engine.
 3. Excessive exhaust temperature.
 4. Load balance and liquid load.
 5. Safety valve and relief valve.
- N. List the color codes used to identify the following systems:
- | | |
|------------------|----------------------|
| 1. Seawater | 6. JP-5 |
| 2. Firemain | 7. Lube Oil |
| 3. Potable water | 8. Low Pressure Air |
| 4. Fuel Oil | 9. High Pressure Air |
| 5. Sewage | 10. Steam |
- O. Become familiar with the piping system designation and marking criteria outlined in NSTM 505.

SECTION 1102 - ELECTRICAL FUNDAMENTALS

A. Reference Materials.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 300, 310, 313, 320
3. Electrician's Mate 3 & 2, NAVEDTRA 10546
4. Blueprint Reading and Sketching, NAVEDTRA 10077
5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Identify the function and application of each of the following.

- | | |
|--------------------------------|-----------------------------|
| 1. Voltage tester | 17. Bus transfer switches |
| 2. Ammeter | (automatic/manual) |
| 3. Wattmeter | 18. Voltage-adjusting |
| 4. Voltmeter | (manual/auto) |
| 5. Tachometer | 19. Governor motor control |
| 6. Frequency meter | rheostat |
| 7. Transformer | 20. Kilowatt meter |
| 8. Voltage regulator | 21. Meter selector switches |
| 9. Reverse power relay | 22. Power available lights |
| 10. Controllers (LVR/LVP/LVRE) | 23. Breaker position lights |
| 11. Fuses | 24. Power factor capacitor |
| 12. Distribution panels | 25. Droop switch |
| 13. Circuit breakers | 26. Ground detector |
| 14. Switchboard | 27. Phase-sequence meter |
| 15. Synchronizing monitor | 28. Megger |
| 16. Thermocouple | 29. Conductor |
| | 30. Signal Generator |

C. Define the following terms used in electrical theory.

- | | |
|-------------------------|------------------------------|
| 1. Voltage | 12. Prime mover |
| 2. Current | 13. Field excitation |
| 3. Ampere | 14. Parallel/split plant |
| 4. Power factor (p.f.) | generator operation |
| 5. Watt | 15. Isochronous |
| 6. Resistance/ohm | 16. Droop |
| 7. Generator | 17. Selective tripping |
| 8. Armature/stator | 18. Field/Rotor |
| 9. Hertz | 19. Alternating Current (AC) |
| 10. Direct Current (DC) | 20. Ohm |
| 11. Short Circuit | 21. Motor |

D. State the basic unit of measure and list the symbols used for identifying the following:

- | | |
|---------------|--------------|
| 1. Voltage | 4. Frequency |
| 2. Current | 5. Power |
| 3. Resistance | |

- E. State the basic principle of electrical power generation.
- F. State the relationship between current, voltage and resistance.
- G. Identify the advantages of an ungrounded system over a grounded one.
- H. Explain the procedures for hooking up shore power.
- I. Explain the procedures for hooking up and removing casualty power.
- J. Compare & contrast power seeking and normal seeking ABTs.
- K. Explain how to detect, isolate, and clear an electrical ground.

SECTION 1103 - SAFETY FUNDAMENTALS

A. Reference Material:

1. Naval Engineering Manual, COMDTINST M9000.6
2. Applicable NSTM Chapters; refer to Chapter 001, Publications Index
3. Unit Safety and Occupational Health Program, COMDTINST 5100.44
4. Safety and Environmental Health Manual, COMDTINST M6260.2
5. Naval Safety Supervisor, NAVEDTRA 10808
6. Vessel Safety Quick Reference Guide, COMDTPUB P5100.51
7. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. State where safety precautions are to be posted on machinery.

C. State which shipboard spaces are required to have Eye Wash Stations.

D. State the requirements of the hearing conservation program.

E. State the requirements of the heat stress program. What is a Physiological Heat Exposure Limit (PHEL) Chart?

F. State proper tag-out procedures (including color coding of tags).

G. State the requirements of the Respiratory Protection Program (i.e. color coding of respirators, shelf life, in-line respirators, etc...)

H. Explain the procedures for conducting portable electric tool handling and safety inspections.

I. Explain the intended use and placement of battle lanterns and emergency lighting.

J. State the benefits of a well administered electrical safety program.

K. State the use and protective function of the following.

- | | |
|--------------------------------|---|
| 1. Lagging | 14. Fuel oil/lube oil strainer shields |
| 2. Reach rod | 15. Fuel oil/lube oil piping flange shields |
| 3. Quick-closing valves | 16. Overspeed trip |
| 4. Automatic cutout | 17. Recirculating Valves |
| 5. Machinery guards | 18. Speed limiting Governor |
| 6. Relief/Safety valves | 19. Diaphragm Control Valve |
| 7. Reducing Valves | 20. Remote Operated Valve (Emergency Cut Out) |
| 8. Check Valve | 21. Relief Valve |
| 9. Constant Pressure Regulator | 22. Grounding Wand |
| 10. Coupling Cover | 23. Electrical Matting |
| 11. Red Gear Cover Locks | 24. Pull Away Cane |
| 12. Ground Indicators | |
| 13. Breakers/Fuses | |

L. Explain the procedure for replacing fuses and using fuse pullers.

M. State the effect and/or hazard caused by the following equipment:

- | | |
|-----------------------------------|-------------------------------|
| 1. Improper pump or gland packing | 6. Improper thread engagement |
| 2. Misuse of valves | 7. Lube oil purification |
| 3. Packing gland too tight | 8. Improper use of tools |
| 4. Bowed Shaft | 9. Misaligned Machinery |
| 5. Hot Surface | |

N. Identify the general safety precautions to be observed when operating high speed, rotating machinery.

O. Identify the importance of secured deckplates, gratings, handrails, and safety chains.

P. State the reasons for good housekeeping practices in engineering spaces.

Q. Identify the hazards of fuel oil or lube oil in bilges.

R. State the special hazards involved and procedures to be followed when working on a system with single-valve protection.

S. Identify the safety precautions to be employed when handling and storing acids and alkalies.

T. State the potential hazards that exist to personnel entering or working in an un-ventilated space where CO(2) and/or Halon has been discharged.

- U. State the precautions to be followed before entering a sealed void or compartment.
- V. Identify the hazards to personnel working in a space where steam is being released through steam hoses or steam smothering systems.
- W. State the potential hazards caused by operating an electrical submersible pump in water.
- X. State the possible results of an open and unattended sounding tube on potable water, feedwater, fuel oil, and lube oil tanks.
- Y. Explain the requirements for using portable electric lighting (type, construction, and usage).
- Z. Explain the reason for capping sound-powered telephone outlets when not in use.
- AA. Explain the procedures for removing a victim from an energized circuit.
- BB. Explain how variations in environment effect body resistance to electrical shock.
- CC. Identify the safety precautions for portable electrical equipment.
- DD. Explain the proper procedures to be followed prior to working on electrical machinery/equipment and energized circuits.
- EE. Identify the safety precautions for asbestos, fiberglass insulation materials, refrigerants, mercury, lead-based materials, and fluorescent lamps.
- FF. State the requirements/restrictions of the following in engineering spaces:
 - 1. Long-sleeved shirts
 - 2. Hats
 - 3. Goggles/face mask
 - 4. Gloves
 - 5. Steel-toes shoes
 - 6. Respirators
 - 7. Earplugs/protectors
 - 8. Polyester clothing
 - 9. Undershirt
 - 10. Electrical Safety Matting
 - 11. Jewelry
- GG. State the importance of eye safety. (i.e. especially use of contact lenses)

- HH. Why is it important to always stay consciously aware of the position of the shaft turning gear when starting the main engines?
- II. Define an IDLH atmosphere and how it is determined.
- JJ. State the purpose and use of the information contained on a Material Safety Data System (MSDS). How is an MSDS obtained?
- KK. State the importance of enforcing a unit TAG-OUT program.
- LL. Explain the proper procedures to follow when working on a pressurized system (fuel, L/O, Hydraulic).
- MM. Familiarize yourself with the access and escape routes (egress) of each Engineering Space.
- NN. State the procedures and safety precautions required for personnel working aloft and over the side.
- OO. State the requirements for the proper handling and storing of calcium hypochlorite.

SECTION 1104 - HYDRAULIC FUNDAMENTALS

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. Fluid Power, NAVEDTRA 12964
3. NSTM Chapter 556
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following terms, as applied to hydraulics:

- | | |
|-----------------|----------------------|
| 1. Force | 10. Linear Actuator |
| 2. Area | 11. Rotary Actuator |
| 3. Displacement | 12. Sequential Speed |
| 4. Volume | 13. Reciprocating |
| 5. Pressure | 14. Orifice |
| 6. Reservoir | 15. Solenoid |
| 7. Regulator | 16. Viscosity |
| 8. Accumulator | 17. Pressure Gauge |
| 9. Actuator | 18. Pressure Switch |

C. Briefly state the function of the following in a hydraulic system.

- | | |
|------------------------------|--------------------------|
| 1. Hydraulic Pump | 8. Relief Valve |
| a. Vane | a. Simple |
| b. Gear | b. Compound |
| c. Piston | |
| d. Screw | |
| 2. Strainer | 9. Actuator |
| a. Simplex | a. Linear |
| b. Duplex | b. Rotary |
| 3. Accumulator | 10. Check Valve |
| a. Piston | a. In-line |
| b. Spring | b. Pilot-pressure |
| c. Bladder | c. By-pass |
| 4. Sequencing Valve | 11. Filter |
| 5. Direction Control Valve | 12. Flow Control |
| a. Two Position,
Four-Way | a. Fixed |
| 6. Unloading Valve | b. Variable |
| 7. Hydraulic Fluid | 13. Counterbalance valve |

- D. Explain the basic principles of operation and use of the following hydraulic systems.
1. Loop - Open/Closed
 2. Re-Generative
- E. Become familiar with MLC Standard Specifications for Cleaning and Flushing Hydraulic Systems.
- F. State the relationship between:
1. Flow rate and actuator speed.
 2. System pressure and load capacitor.

SECTION 1105 - ELECTRIC DRIVE PROPULSION FUNDAMENTALS

- A. Reference Material.
 - 1. Electrician's Mate 3 & 2, NAVEDTRA 10546
 - 2. NSTM Chapter 235
 - 3. Manufacturers' Technical Publications
- B. Describe the theory of operation for an electric drive propulsion plant.
- C. Describe the function of the following system components:
 - 1. Gas turbine generator
 - 2. Diesel generator
 - 3. Electric motor
 - 4. Propulsion controls
 - 5. Shaft & propeller
- D. Explain why some electric drive propulsion plants do not require reduction gears.
- E. Describe the operation of DC propulsion plants.
- F. Describe the operation of AC propulsion plants.
- G. State the advantages and disadvantages of an electric drive propulsion plant.
- H. State the hazards and safety precautions associated with an electric drive propulsion plant.

SECTION 1106 - WELDING AND CUTTING FUNDAMENTALS

A. Reference Material.

1. NSTM Chapter 074 (V1, V2, V3)
2. NSTM Chapter 550
3. Hull Maintenance and Technician 3 & 2, NAVEDTRA 10571
4. Manufacturers' Technical Publications

B. Describe the following welded joints:

1. Butt joint
2. Edge joint
3. Corner joint
4. Tee joint
5. Lap joint

C. Describe the following weld types:

1. Bead
2. Fillet
3. Groove
4. Plug
5. Slot
6. Seam
7. Tack

D. Define the following parts of a weld:

1. Face
2. Toe
3. Root

E. Define the following terms:

1. Pass
2. Bead
3. Layer
4. Deposition sequence
5. Backstep sequence
6. Wandering sequence
7. Buildup sequence
8. Cascade sequence
9. Block sequence

F. State the difference between a "weld symbol" and a "welding symbol."

1. Describe the parts of a "welding symbol".

G. Define coalescence and how it applies to welding.

- H. Explain the welding procedures used for the following:
1. Shielded metal arc welding
 2. Gas shielded arc welding (GTA and GMA)
 3. Oxyacetylene welding
- I. State the meaning of each section in the classification number for electrodes.
- J. Define the following terms:
1. Striking the arc
 2. Tapping
- K. Explain the purpose of welding rods.
- L. Explain when and why flux is used.
- M. Describe the following types of welding flames:
1. Neutral
 2. Reducing (Carburizing)
 3. Oxidizing
- N. Discuss oxidation and how it applies to gas cutting.
- O. Describe the parts of an oxyacetylene cutting tip, what gases come through the different parts and how each gas effects the metal.
- P. Describe brazing and braze welding.
- Q. Define soldering and its limitations.
- R. Define the following Nondestructive Testing (NDT) techniques:
1. X-ray
 2. Magnaflux
 3. Dye penetrant
 4. Hydrotesting
 5. Air testing
- S. Describe the following weld defects and their causes:
1. Spatter
 2. Overlap
 3. Undercut
 4. Void
 5. Inclusions
 6. Brittleness
 7. Incomplete fusion
 8. Inadequate joint penetration
 9. Inadequate root penetration
 10. Cracks

T. Discuss the following safety related items:

1. Personal protective equipment (i.e. helmet, shield, eye protection, gloves, leather clothing, respirator).
2. Condition of hoses and torches.
3. Operation of backfire flame arrestors and check valves.
4. Condition of regulators.
5. Proper sequence for lighting the torch.
6. Dangers of excessive acetylene pressure. Define excessive pressure.
7. Presence of flammables in the area.
8. Protecting the deck and adjacent compartments.
9. Importance of Hotwork chit / Gas-Free Certificate.
10. Security of cylinders in rack and importance of keeping the oxygen and acetylene bottles upright.
11. Dangers of working on metals painted with lead, chromate, or vinyl based paints.
12. Proper cleaning of cutting tips.

SECTION 1107 - CASUALTY CONTROL FUNDAMENTALS

- A. Reference Materials.
 - 1. Casualty Control Manual (CCM)
 - 2. Naval Engineering Manual, COMDTINST M9000.6
 - 3. Naval Ships Technical Manual, Chap 079, VOL 3
 - 4. Damage Control Book and Drawings
 - 5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings.
- B. Become familiar with the content and procedures of the Casualty Control Manual.
- C. In accordance with references (2 & 3), discuss the objective of engineering plant casualty control.
- D. Discuss engineering plant casualty control reporting procedures between watchstations, EOW, and the bridge,
- E. Discuss the basic procedural differences in casualty control between multiple screw ships and single screw ships and the effect on the maneuverability of the ship.
- F. Discuss the training/qualifications and use of the shipboard engineering casualty control training team (ECCTT).
- G. Describe the relationship between Restricted Maneuvering Doctrine and Casualty Control Manual.

SECTION 1201 - REQUIRED LINE DRAWINGS

Line drawings are required for the following systems and subsystems. Unit specific drawings shall be accomplished in accordance with the unit's EOW PQS.

- A. Main Diesel Engine
 - 1. Sea Water Cooling
 - 2. Jacket Water Cooling
 - 3. Lube Oil
 - 4. Fuel Oil
 - 5. Start Air
 - 6. Exhaust
- B. Ship Service Diesel Generator
 - 1. Sea Water Cooling
 - 2. Jacket Water Cooling
 - 3. Lube Oil
 - 4. Fuel Oil
- C. Reduction Gears
 - 1. Lube Oil
 - 2. Clutch Air
- D. Steering Gear System
- E. Auxiliary Sea Water Cooling System
- F. Fuel Transfer, Storage, and Service
- G. Lube Oil Transfer and Storage
- H. Hydraulic Oil Transfer and Storage
- I. Compressed Air System
 - 1. Ship Service Air (LP)
 - 2. Start Air System (MP/HP)
- J. Ballast System
- K. Main/Secondary Drainage Systems
- L. Vacuum Sewage System
- M. Potable Water System

- N. Evaporator
 - 1. Sea Water Supply
 - 2. Brine
 - 3. Distillate
 - 4. Vacuum
 - 5. Condensate Return
 - 6. Chemical Treatment
- O. Boilers and/or Waste Heat Recovery System
 - 1. Feedwater
 - 2. Steam
 - 3. Condensate Return
- P. Refrigeration System
- Q. Air Conditioning and Chill Water System
- R. Electrical Distribution
- S. Firemain System
- T. AFFF System
- U. JP-5 Transfer and Storage

SECTION 1202 - DIESEL ENGINE SYSTEM (MDE, SSDG, EDG)

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 233 and 262.
3. Engineman 3 & 2, NAVEDTRA 10541
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of the Main Diesel Engine (MDE), Ship's Service Diesel Generator (SSDG), and Emergency Diesel Generator (EDG).

C. Define the following:

- | | |
|---------------------|------------------------|
| 1. Intake/Exhaust | 5. Auto ignition point |
| 2. Compression | 6. Hydraulic lock |
| 3. Combustion | 7. Scavenging |
| 4. Timing/Injection | |

D. Explain the two-stroke diesel cycle, including the events in sequence that occur during one cycle.

E. Explain the four-stroke diesel cycle, including the events in sequence that occur during one cycle. Define Intake Stroke, Compression Stroke, Power Stroke, and Exhaust Stroke.

F. Describe the types of starting mechanisms used on diesel engines.

G. Identify the types of diesel cylinder arrangements.

H. List the causes and effects of engine overspeed.

I. State the difference between direct and indirect drive.

J. Principles of Operation. Referencing the appropriate system line diagram, explain the lube oil and fuel oil flow paths through the MDE, SSDG, and EDG.

- K. System Components and Component Parts(MDE, SSDG, and EDG). For the designated items, answer the following questions.

Column A represents "Where is it located and what is its function?"

Column B represents "What protection is provided by this component/Part?"

	<u>A</u>	<u>B</u>
1. Cylinder Block	X	
2. Crankcase/bedplate	X	
3. Cylinder head and liner	X	
4. Governor	X	
5. Pistons and Connection rods	X	
6. Turbocharger	X	
7. Camshafts	X	
8. Ports/valves	X	
9. Crankshaft	X	
10. Flywheel	X	
11. Aftercooler/Intercooler	X	
12. Manometer	X	X
13. Blower shutdown	X	X
14. Remote fuel shutdown	X	X
15. Pyrometer	X	
16. Overspeed trip	X	X
17. Explosion covers	X	X
18. Fuel Rack	X	
19. Fuel Pump Control Shaft & Crossover Linkage	X	
20. Water Pump	X	
21. Exhaust Manifold	X	
22. Valve Lever Mechanism	X	
23. Fuel Injectors	X	
24. Governor Control Linkage	X	
25. Fuel Injector Pump Support and Drive	X	
26. Pneumatic, Electric, and Mechanical Control system	X	
27. Thermostatic Control Valve	X	
28. Monitoring Console/Panels	X	X
29. Emergency Shutdown	X	X
30. Local/Remote Control Panels	X	

- L. Define "crankweb deflection" and how/when is it measured.

- M. What is the purpose of a center section overhaul/Top end overhaul and at what time does each take place?

N. Principles of Operation.

1. How do the components outlined in paragraph K work together to achieve the system function.
2. Using the appropriate system line diagram, show the lube oil and fuel oil paths of the MDE, SSDG, and EDG.
3. Explain the diesel cycle using a P-V diagram.
4. State the importance of both the Jacket Water and Sea Water Cooling systems, and how the two interface.

O. Parameters and Operating Limits. For the MDE, SSDG, and EDG, list the min/max operating parameters for the following items:

- | | |
|-----------------------|--------------------------|
| 1. Fuel Oil Pressure | 6. L/O TEMP |
| 2. L/O Pressure | 7. Jacket Water Pressure |
| 3. Jacket Water Temp | 8. Sea Water Temp |
| 4. Sea Water Pressure | 9. Exhaust Temp |
| 5. Start Air Pressure | |

P. System Interface.

1. What is the relationship between lube oil temperature, jacket water temperature, and sea water cooling temperature.
2. Identify how the following effect overall system function:
 - a. Loss of Electrical Power
 - b. Loss of Fuel Oil Pressure
 - c. Loss of L/O Pressure
 - d. Loss of Starting Air Pressure
 - e. High L/O and J/W Temperature
 - f. Loss of clutch air pressure

Q. Safety Precautions.

1. List the safety precautions that apply to positive crankcase pressure on diesel engine systems?
2. List the precautions that must be taken when walking around any diesel exhaust piping? After a crankcase explosion?

SECTION 1203 - GAS TURBINE SYSTEM

A. Reference Material.

1. Gas Turbine System Technician 3 & 2, NAVEDTRA 10548 (mechanical) and 10550 (electrical)
2. NSTM Chapter 234
3. Ship's Technical Pubs, Drawings and Information Books
4. MK2 Correspondence Course, CG Institute(E-23201 pamphlet)
5. MK3 Correspondence Course, CG Institute(E-33201 pamphlet)
6. Manufacturers' Technical Publications, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. For the designated items, answer the following questions.

Column A represents "What is its function and location?"

Column B represents "What are the sources of power?"

Column C represents "What protection is provided by this component/part?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Base enclosure assembly	X	X	X
2. Fire detection and extinguishing system	X	X	X
3. Water wash system	X	X	X
4. Compressor inlet plenum	X		
5. Compressor	X	X	
6. Combustion section	X	X	
7. High pressure (HP) turbine	X	X	
8. Free power turbine	X	X	
9. Ignition system	X	X	
10. High-speed flexible coupling	X	X	
11. Gas turbine bearings	X	X	
12. Accessory drive assembly	X	X	
13. Compressor variable stator vanes	X	X	X
14. Engine bleed air manifolds	X	X	
15. Customer bleed air manifold	X	X	
16. Inlet guide vanes	X	X	
17. Altair solenoid valves	X		
18. Motor-operated fuel valve	X		

C. Principles of Operation.

1. Referencing system line diagram, show the path of primary and secondary air through the engine.
2. What are the sources and uses of bleed air within the gas turbine?
3. What are the effects of a "hot shutdown"?

4. List the components involved and state the procedures for:
 - a. Operating the accessory drive assembly during start-up and normal operation.
 - b. Starting a gas turbine.
 - c. Securing a gas turbine.
 - d. Emergency stopping of a gas turbine.
 - e. Water Wash.
 5. How do the variable stator vanes prevent compressor stalls of a gas turbine?
- D. Parameters/Operating Limits.
1. What are the normal operating value(s) for the following:
 - a. Gas generator RPM
 - b. Free turbine RPM
 - c. Lube oil pressure
 - d. Gas generator vibrations
 - e. Free turbine vibrations
 - f. Free turbine inlet temperature
- E. System Interface.
1. How do the following outside influence effect this system:
 - a. Foreign object damage (FOD)
 - b. Loss of electrical power
 - c. Loss of local control console
 - d. Loss of Central Control Station (CCS) console
 - e. Loss of ship's control console
 - f. Loss of ship's service air system
- F. Safety Precautions.
1. State the safety precautions that apply when entering or leaving a gas turbine?
 - a. Plenum
 - b. Enclosure

SECTION 1204 - GAS TURBINE AIR INTAKE AND EXHAUST SYSTEM

A. Reference Material.

1. Gas Turbine System Technician 3 & 2, NAVEDTRA 10548 (mechanical) and 10550 (electrical)
2. NSTM Chapter 234
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following as applied to the gas turbine engine:

- | | |
|-----------------------------|------------------------------|
| 1. Gas generator | 11. Annular combustor |
| 2. Compressor | 12. Can annular combustor |
| 3. Combustion chamber | 13. Can combustor |
| 4. High-pressure turbine | 14. Axial/ Radial flow |
| 5. Free turbine | 15. Power measurement |
| 6. Accessory drive assembly | 16. Single-shaft gas turbine |
| 7. Freewheeling | 17. Dual spool gas turbine |
| 8. Compressor stall | 18. Power takeoff assembly |
| 9. Compressor surge | 19. Ignitors |
| 10. Burner can | |

C. Explain the Brayton cycle using a pressure volume diagram.

D. Explain the difference between an open and closed engine cycle.

E. Explain the energy conversion process that occurs in the following:

1. Compressor
2. Combustion chamber
3. Turbine

F. Explain the effects of the marine environment on gas turbine engines and the precautions taken to compensate for this environment.

G. State the possible causes of ice formation on air inlets.

H. Explain the effect of foreign object damage on compressor blading.

- I. System Components and Component Parts. For the designated items, answer the following questions.

Column A represents "What is its function and location?"

Column B represents "What protection is provided by this component/part?"

	<u>A</u>	<u>B</u>
1. Engine removal access equipment/fittings	X	
2. Moisture separators	X	X
3. Intake Duct	X	
4. Module cooling duct	X	
5. Gas turbine base/enclosure assembly	X	X
6. Gas turbine inlet screen	X	X
7. Exhaust duct	X	
8. Anti-icing manifold	X	

- J. Principles of Operation.

1. Using system line diagram, show the path of air from the moisture separators (demister screens) to the exhaust.
2. What is the sequence of component involvement to prevent inlet ice formation?

- K. System Interface.

1. How do the following outside influences effect this system:
 - a. Air temperature and humidity variations
 - b. Foreign object damage (FOD)
 - c. Poor Fuel Quality

- L. Safety Precautions.

1. What special safety precautions apply to yard or industrial activity in the "clean area" of the intake system?

SECTION 1205 - PROPULSION SHAFTING, BEARINGS, PROPELLERS AND REDUCTION GEARS SYSTEMS

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 078, 244, 245, 262, 9420, 9430
3. Principles of Naval Engineering, NAVEDTRA 10788
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following:

- | | |
|---------------------------------------|--|
| 1. Thrust | 11. Pinion |
| 2. Reduction ratio | 12. Pitch Control Unit |
| 3. Flexible coupling | 13. Intermediate gear |
| 4. Auxiliary Drive | 14. Bull Gear |
| 5. Quill shaft | 15. Turning Gear |
| 6. Solid Coupling | 16. Pedestal Bearing |
| 7. Spring Bearing | 17. Packing Gland |
| 8. Controllable Pitch Propeller (CPP) | 18. Gear (Spur, helical, Herring Bone) |
| 9. Clutch | 19. Fixed Pitch Propeller |
| 10. Come home bolts | 20. Hydra-start |

C. Describe the type and state the frequency of reduction gear inspections.

D. How is reduction gear lubrication inspected and tested.

E. Explain the procedures for opening/inspecting/working on main propulsion reduction gear.

F. State the importance of taking thrust bearing readings.

G. Explain the advantages/disadvantages of the various types of gears (i.e. straight, helical).

H. State the reasons for using Reduction Gear heaters.

I. How do the following effect reduction gear care?

- | | |
|---|------------------------|
| 1. Lubrication | 4. Noises & vibration |
| 2. Locking/unlocking of the shaft | 5. Open for inspection |
| 3. Gear tooth inspection (Tooth contact and wear) | 6. Spray Pattern |

- J. State the advantages and disadvantages of fixed-pitch propellers.
- K. How does a thrust bearing transmit power from the screw to the hull?
- L. Define "scraping" a bearing. What is babbit?
- M. Define "freewheeling" or "trailing" a shaft.
- N. SYSTEM COMPONENTS AND COMPONENT PARTS. State function of following system components.
- | | |
|------------------------------|-----------------------------------|
| 1. Line shaft | 12. Stern Tube bearing |
| 2. Thrust shaft | 13. Strut Bearing |
| 3. Stern tube shaft | 14. Propeller |
| 4. Tail shaft | 15. Inflatable Shaft Seal |
| 5. Line shaft bearings | 16. Main Thrust Bearing |
| 6. Bulkhead stuffing boxes | 17. Controllable Pitch Prop (CPP) |
| 7. Shaft seal | 18. Spring bearing |
| 8. Pedestal bearing | 19. Journal bearing |
| 9. Stuffing tube | 20. Turning Gear |
| 10. O. D. Box | |
| 11. Propeller Hub and Blades | |
- O. Principles of Operation. Explain how or when the following are accomplished:
1. Lubrication of line shaft bearings
 2. Lubrication of stern tube and strut bearings
 3. Under what condition would you lock the shaft?
 4. How do you lock the shaft?
- P. Parameters/Operating Limits. Provide the normal operating values and high/low limits of the following:
1. Journal bearing temperature.
 2. Main Thrust bearing temperature.
 3. Line Shaft bearing temperature.
 4. Shaft seal pressure.
 5. Fwd Quill bearing temperature.
 6. Fwd Pinion bearing temperature.
 7. Fwd Bull bearing temperature

Q. System Interface. How do the following outside influences effect this system?

1. Loss of lube oil service.
2. Loss of Stern Tube seal water.
3. Foreign matter.

R. Safety Precautions.

1. Explain the procedures and safety precautions required for energizing the inflatable shaft seal.
2. Explain the procedures and safety precautions that are to be taken prior to engaging and disengaging a shaft.

SECTION 1206 - CONTROLLABLE PITCH PROPELLER SYSTEM

A. Reference Material.

1. NSTM Chapter 245
2. Naval Engineering Manual, COMDTINST M9000.6
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. State the function of the following system components and component parts.

1. Hydraulic oil power module
2. Oil Distribution Box
3. Control Valve Manifold
4. Electric pumps
5. Relief valves
6. Reducing valves
7. Control Piston
8. Pilot Piston
9. Emergency pitch positioner assembly
10. Valve Rod
11. Follow up Rod
12. Propeller Shaft
13. Hub Assembly
 - a. Propeller blades
 - b. Hub body
 - c. Blade seals
 - d. Crank pins
 - e. Crank pin ring
 - f. Crosshead
 - g. Hub piston/Servomotor piston
 - h. Regulating valve
14. Sump Tank
15. Head Tank
16. Gear driven hydraulic oil pump

C. Principles of Operation.

1. Referencing system line diagram, show the path of hydraulic oil from the sump tank through the system & back to the sump.

2. What is the sequence of component involvement for:
 - a. Supply control oil to the oil distribution box to vary the position of the valve rod.
 - b. Supply high pressure (HP) hydraulic oil to the propeller hub to effect a change in pitch.
 - c. Change blade pitch within the propeller hub.
 - d. Prevent water from entering the hub & oil leaking out.
 3. List the steps to be taken when an external oil leak is found.
 4. Explain how to verify and adjust pitch.
- D. Explain the advantages and disadvantages of controllable pitch propellers (CPP). Define the following in regard to the CPP:
1. Inching
 2. Feet of Pitch
 3. % of Pitch
- E. System Interface.
1. How does loss of electrical power effect this system?

SECTION 1207 - STEERING SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 562
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. For the designated items, answer the following questions.

Column A represents "What is its function and location?"

Column B represents "How is the overall system effected if component has a failure."

Column C represents "What is the source(s) of power?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Transmission Equipment			
a. Central (Synchro) transmitter	X	X	X
b. Steering control cable selector switches	X	X	X
c. Steering control cables (PORT and STBD)	X	X	
d. Central (Synchro) receiver	X	X	X
e. Trick wheel	X	X	
f. Auto pilot systems	X	X	
2. Control Unit			
a. Differential	X	X	
b. Follow-up Linkage	X	X	
c. Transfer Valve	X	X	X
3. Power Unit			
a. Steering motors	X	X	X
b. Steering pumps	X	X	
c. Emergency hand pump	X	X	
d. Block & Tackle	X	X	
4. Ram Unit			
a. Ram	X	X	
b. Cylinder	X	X	
c. Rudder Linkage	X	X	
d. Crush blocks (Copper)	X	X	
e. Stops (Mechanical and Hydraulic)	X		
5. Remote Reading Indicators	X	X	X

C. Principles of Operation.

1. How do the components work together to achieve system function?
2. What are the principles of operation of the auto pilot?
3. How is the vertical weight of the rudder and rudder stock supported?
4. Explain the transmittal of forces (via the rudder) necessary to cause the ship to change its heading.
5. Explain the difference among the following steering modes.
 - a. Gyro
 - b. Non Follow Up Forward
 - c. Non Follow Up Aft
 - d. Hand Electric
 - e. Manual (hand pump)

D. Become familiar with your unit's Steering Bill. What are the steering casualty response procedures for your unit?

E. Parameters/Operating Limits.

1. What is the rudder's maximum operating angle?

F. System Interface.

1. How does loss of ship's power effect this system?

G. Safety Precautions.

1. What special safety precautions apply to cycling rudders inport?

SECTION 1208 - DIESEL ENGINE JACKET WATER SYSTEM (MDE, SSDG)

A. Reference Material

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 233
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system?

C. Components and Component Parts(MDE, SSDG). For the designated items, answer the following questions.

Column A represents "What is it's function?"

Column B represents "Where is it located?"

Column C represents "What are the safety protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Suction Valves	X	X	
2. Belt Driven Pump	X	X	X
3. Discharge Valves	X	X	
4. Jacket Water Cooler	X	X	
5. Lube Oil Cooler	X	X	
6. Temperature Regulating Valve	X	X	X
7. Expansion Tank	X	X	X
8. Intercooler	X	X	
9. Orifice Plates	X	X	
10. Jacket Water Heater	X	X	X
11. Gauges and Thermometers	X	X	
12. Relief Valves.	X	X	

D. Principles of Operation.

1. Explain how the above components work together to achieve system function.
2. State the importance of the Temperature Control Valve (AMOT valve) in regard to MDE and SSDG cooling.
3. Explain the procedures for conducting a J/W Test.

E. Parameter/Operating Limits. For the MDE and SSDG, list the minimum, maximum, and normal operating setpoints of the following.

1. Pump discharge pressure.
2. Engine inlet/outlet temperature.
3. J/W Cooler inlet and outlet temperature.
4. Lube Oil Cooler inlet and outlet temperature.

SECTION 1209 - SEAWATER COOLING SYSTEM

A. Reference Material.

1. NSTM Chapter 233
2. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. State the function and associated safety devices of the following system components and component parts:

1. Seachest
2. Suction and Discharge valve
3. System Cross Connects
4. Overboard discharge valves
5. Auxiliary seawater-reducing station adjusting valve
6. Pressure and temperature gauges
7. Piping (Specify size and material)
8. Sea strainers
9. Vent valves.
10. Pumps
11. Deicing valves (if installed)
12. Zincs
13. Mechanical Seals
14. Packing

C. Principles of Operation.

1. How do the above components work together to achieve system function?
2. What is the effect of a clogged seachest? What are the indications?
3. What is the normal operating pressure of this system? How do you regulate operating pressure?

D. System Interface. How does this system interface with the following:

1. Main Propulsion Diesel Engine Cooling System
2. Main Gas Turbines
3. Ship's Service Diesel Generator (SSDG) Engine
4. Main Reduction Gear Cooling System
5. Distilling Unit
6. Firemain
7. Air Conditioners
8. Reefers
9. Oily Water Separator
10. Bilge and Ballast System
11. CPP System
12. Shaft Seals
13. Fin Stabilizers
14. Sewage System

SECTION 1210 - FUEL OIL AND LUBE OIL SYSTEMS

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 262, 505, 541, 542, and 571.
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. State the purpose of the following:

- | | |
|-------------------------------------|----------------------|
| 1. Fuel and Water Report | 3. Fuel Oil Test Log |
| 2. NAVY Oil Analysis Program (NOAP) | 4. Lube Oil Test Log |

C. Define the following terms:

- | | |
|-------------------------------|-----------------------------|
| 1. Diesel Marine Fuel (DFM) | 13. Fuel Dilution |
| 2. Jet propulsion fuel (JP-5) | 14. Emulsion |
| 3. Viscosity | 15. Gravity Feed |
| 4. Vapor pressure | 16. Coalesce |
| 5. Atomization | 17. Wedge Action (Bearings) |
| 6. Combustion | 18. "Clear and Bright" |
| 7. Flash point | 19. Batch Purification |
| 8. Fire point | 20. Free Water |
| 9. Pour point | 21. Saybolt viscosity |
| 10. Bottom sediment | 22. Biocide Treatment |
| 11. Spectrographic Analysis | 23. Specific Gravity |
| 12. MIL-L-9000 | 24. MIL-L-2104 |

D. List the types of oil used on board your cutter:

E. Briefly Identify the function of the following equipment:

- | | |
|---------------------------------|-------------------------|
| 1. Hydrometer | 7. AEL MK I tester |
| 2. Flash screen | 8. AEL MK III tester |
| 3. Water-Indicating paste | 9. Sight Flow Indicator |
| 4. Tank level indicators (TLIs) | 10. Filter-separator |
| 5. Fuel oil filter coalescer | 11. Sounding tubes |
| 6. Purifier | 12. Duplex strainer |

F. Explain how lubricating oil protects a system from friction and heat.

G. Identify the physical appearance of improperly purified lube oil or contaminated oil.

H. Identify the process(es) by which a purifier can do its job.

- I. System Components and Component Parts (MDE, SSDG, RED GEAR). For the designated items, answer the following questions. Explain how the following components apply to the.

Column A represents "What is its function and where is it located?"

Column B represents "What protection is provided by this component?"

	<u>A</u>	<u>B</u>
1. Lube oil pump	X	
2. Lube oil pumps (standby/emergency)	X	X
3. Attached lube oil pump	X	
4. Lube oil filter and strainer.	X	X
5. Lube oil cooler	X	
6. Unloading valve	X	X
7. Lube Oil Prelude pump	X	
8. Lube Oil Sample valves	X	
9. Lube Oil Purifier	X	X
10. Lube oil heater	X	X
11. Lube oil storage/settling tanks	X	
12. Fuel oil filling piping and valves	X	
13. Fuel oil transfer piping/valves	X	
14. Fuel oil storage tanks and overflow tanks	X	
15. Fuel oil service tanks	X	
16. Fuel oil transfer pump and hand priming pump	X	
17. Dirty oil and stripping tanks	X	X
18. Sludge tanks	X	
19. Fuel Oil Drain lines	X	X
20. Fuel Oil Manifold	X	
21. Fuel Oil Prefilter	X	X
22. Fuel Oil Coalescer/Purifier	X	X
23. Lube Oil and Fuel Oil Emergency cut out valves	X	X
24. Lube Oil and Fuel Oil Level Tank Indicators	X	X
25. Ballast Tanks		

- J. Principles of Operation.

- Using associated line diagrams, show the path of fuel oil from the storage tanks to the equipment serviced.
- What is the functional relationship between the emergency standby and attached lube oil pumps?

- K. Parameters/Operating Limits. For the MDE, SSDG, and RED Gear, state the high and low operating parameters.
1. Lube oil pressure and temperature
 2. Bearing Temperature
 3. Duplex strainer differential pressure
 4. Lube Oil Cooler outlet (lube oil) temp
 5. Lube oil sump level
 6. Fuel oil Pressure
 7. Fuel oil temperature
 8. Fuel and Lube oil Storage Tank levels.
- L. System Interface.
1. How does operation of the Ballast, Deballast and Stripping System effect the fuel system?
 2. How do variations in propulsion engine RPM effect lube oil and fuel oil parameters?
- M. Safety Precautions. Explain the appropriate safety precautions and procedures that apply when:
1. Shifting duplex strainers.
 2. Opening and closing system valves.
 3. Transferring Fuel Oil and Lube Oil.
 4. Fueling at Sea and Inport.
 5. Ballasting and Deballasting.
- N. Explain your units Standard Operational Procedure for Fueling at Sea and Inport.
- O. State the procedures for the storage and handling of lube oil, fuel oil, hydraulic oil, and JP-5.
- P. State G-ENE's policy regarding Rubber Expansion Joints (Flex Joints).

SECTION 1211 - COMPRESSED AIR SYSTEM (Low Pressure, High Pressure, and Starting Air)

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 551
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. State the function, associated safety precautions, and relationship of the following items to the Low Pressure, High Pressure, and Starting Air Systems.

- | | |
|------------------------------------|--------------------------|
| 1. Air compressors (LP, HP, Start) | 11. Priority valves |
| 2. Air receivers/accumulators | 12. Cross-connect valves |
| 3. Relief valves | 13. Cut Out Valves |
| 4. Air dehydrator | 14. Unloader |
| 5. Receiver Blowdowns | 15. Piping and valves |
| 6. Moisture separators | 16. In-line oilers |
| 7. Controller | 17. Water Flask |
| 8. Air Flask | 18. Regulators |
| 9. Intercooler | 19. Reducing Stations |
| 10. Alternate Sources of Air | |

C. Parameters/Operating Limits. List the parameters required for regulating:

1. Start Air to Ship Service Generator.
2. Start Air to Main Diesel Engine.
3. Clutch Air to Clutch Air Tank.
4. Start Air to Ship Service (LP) Air Tank.
5. Ship Service Air (LP) to Tool Stations.
6. Ship Service Air (LP) to F/O and L/O purifiers.
7. Atomizing air for boilers.

D. System Interface.

1. How do the following effect start air and clutch air:
 - a. Loss of high-pressure air
 - b. Operation of Cooling Water System.
 - c. Loss of Electrical Power
2. State how the start air system interfaces with the propulsion plant automatic controls.
3. Explain how the compressed air system can be interfaced with an in-line air respirator (if it can).
4. State the purpose of Reducing Stations and Air Regulators.

SECTION 1212 - BALLAST, DEBALLAST, AND STRIPPING SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 079, and 503.
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. For the designated items, answer the following questions.

Column A represents "What is its function and where is it located?"

Column B represents "What are the sources of power?:"

	<u>A</u>	<u>B</u>
1. Fuel oil storage tanks	X	
2. Ballast, deballast and stripping/valves	X	
3. Bilge and fuel oil stripping pump	X	X
4. Fuel and Ballast transfer pumps	X	X
5. Firemain connection	X	
6. Bilge Eductors	X	X
7. Designated ballast tanks (270 WMEC)	X	
8. Sounding Tubes/Vents	X	

C. Principles of Operation. Using system line diagrams, explain (if applicable to your vessel) the path of the following:

1. Seawater to the FO tanks via the Firemain.
2. Seawater from ballast tanks to the sea
3. Seawater to ballast tanks from the sea
4. Seawater to the Ballast tanks via the ballast transfer pump (270 WMEC).
5. Seawater from bilges to the sea via bilge eductors.

D. Explain how contaminated Fuel Oil tanks are restored.

E. Explain the advantages/disadvantages of a designated/unique ballast system (Fuel tanks are not used for Ballasting) over a dual ballast system (Fuel tanks serve the purpose of fuels storage and ballast).

F. System Interface.

1. How does loss of firemain pressure effect this system?
2. How does loss of electrical power effect this system?
3. Explain how ballast system can be used to maintain optimum draft, trim, and overall vessel stability.

SECTION 1213 - BILGE DRAINAGE SYSTEMS

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 503, 505 and 593.
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Referencing system line diagram, list, state the function of the main and secondary drainage systems.

C. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Bilge Eductors	X	X	X
2. Check Valves	X	X	X
3. Bilge high level alarms	X	X	X
4. Suction Valves and Manifold	X	X	X
5. Suction strainer	X	X	X
6. Overboard Discharge Valves	X	X	X
7. Pumps, Piping, and Valves	X	X	X
8. Dirty Oil Pump	X	X	X
9. Sand Piper	X	X	X
10. Dirty Oil Tank	X	X	X
11. OWS Monitoring System	X	X	X
12. OWS Filter Stages	X	X	X
13. Pneumatic valve	X	X	X
14. Gauges	X	X	X
15. Electrical Controllers	X	X	X

D. Principals of Operation. Explain how the above components work together to achieve system function.

E. Parameters/Operating Limits. List the minimum, maximum, and normal operating setpoints of the following:

1. Bilge Level Alarms
2. Firemain Pressure
3. Eductor Operating Pressure
4. Operating Pressure for electric and air operated pumps.
5. Pump Suction Vacuum
6. OWS Stage Pressure Differentials
7. OWS Monitor Parameters

F. System Interface.

1. How does this system interface with the following?
 - a. Loss of electrical power.
 - b. Loss of Ship Service Air
 - c. Loss of Ship Start Air
 - d. Loss of Firemain pressure
 - e. Ballast System
 - f. Auxiliary Sea Water System
2. List the compartments that are serviced by the main drainage and/or secondary drainage systems.
3. List the alternative (emergency) means of dewatering the engine room.

G. Safety Precautions.

1. What general safety precautions apply to this system?
2. State Shipboard, Federal, State and local regulations and procedures for disposing of Oily Waste.

SECTION 1214 - SEWAGE COLLECTION, HOLDING, AND TRANSFER (CHT) SYSTEM

- A. Reference Material.
1. Naval Engineering Manual, COMDTINST M9000.6
 2. NSTM Chapters 074 and 593
 3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
- B. State the contents of the following items as they pertain to ships and related shore facilities:
1. Federal Water Pollution Control Act amendments
 2. Oil Pollution Act as amended
 3. National Environmental Policy Act
 4. MARPOL Regs
- C. State the regulations regarding dumping and plastics, garbage, sewage, and bilge water.
- D. Define the following:
- | | |
|----------------------------|----------------|
| 1. Contiguous zone | 6. Effluent |
| 2. Minor spill | 7. Sludge |
| 3. Major spill | 8. Grey water |
| 4. Oily Waste | 9. Black water |
| 5. Collection Holding Tank | |
- E. Explain the principles of operation of CHT to include:
1. Collection
 2. Holding
 3. Transfer systems (comminuter and strainer)
- F. State the function and general use of:
1. Oil Spill Containment Kit
 2. Oil Disposal Raft "Donut"
 3. Ship Waste Off-load Barge
 4. Oil Spill Containment Boom
 5. Skimmer
- G. List the equipment, protective clothing, and disinfectants used during sewage spill cleanup operations and state the respective cleanup procedures.
- H. State the prohibition against making potable water hose and sewage transfer hose connections/disconnections simultaneously.
- I. Identify the most common way that sewage can transmit infectious disease to personnel.

- J. Identify the activities that must not be performed by personnel while repairing CHT components or when exposed to sewage.
- K. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function and location?"

Column B represents "What are the modes of operation or control?"

Column C represents "What is the function of each position?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Swing Check Valve	X		
2. Deck/ bulkhead stop valve	X	X	
3. Gag Scupper	X	X	X
4. Bypass line	X	X	
5. Eductors / Vacuum pumps	X	X	
6. Tank Level Indicators (TLIs)	X	X	
7. Three Way Valve	X	X	X
8. Electrical Controllers	X	X	
9. Sewage Holding Tank	X		
10. Grey Water Collection Tank	X		
11. Vacuum Pump	X		
12. Water Seal Tank	X		
13. Sewage Holding Tank Discharge Pumps	X		

- L. Principles of Operation.

1. State the alarm setpoints and required actions of the watch upon answering alarm.
2. Using your diagram of the system, show the path of:
 - a. Soil/waste drains from the source to the holding tank.
 - b. Soil/waste drains from the source to overboard at sea/in port.

- M. System Interface.

1. How does this system interface with the following:
 - a. Collection Holding System
 - b. Transfer system
 - c. Setting of "ZEBRA"
2. How would the loss of electrical power effect the system?
3. How would the loss of water pressure effect the system?
4. How would a Vacuum leak effect the system?
5. How would restrictions in the suction and discharge piping effect the system?

N. Safety Precautions.

1. What special safety precautions must be observed when operating this system?
2. What precautions must be taken prior to entering a tank?

SECTION 1215 - POTABLE WATER SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 533
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. SYSTEM COMPONENTS AND COMPONENT PARTS. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the sources of power?"

Column D represents "What are the modes of operation or control?"

Column E represents "What are the safety/protective devices for this component/component part?"

Column F represents "What protection is provided by this component/component part?"

Column G represents "What are the probable indications if this component fails?"

	A	B	C	D	E	F	G
1. Potable water storage tanks	X	X			X		X
2. Manifold	X	X					X
3. Potable water pumps	X	X	X		X		X
4. Priming pumps	X	X	X	X	X		X
5. Piping and valves	X	X					X
6. Relief valves	X	X			X	X	X
7. Deck risers	X	X					X
8. Sounding tubes	X	X		X			X
9. Tank level indicators	X	X	X			X	X
10. Chlorinator/ Brominator	X	X	X	X		X	X
11. Hydropneumatic Tank	X	X			X		X
12. Hot Water Accumulator Tank	X	X			X		X
13. Dechlorinator	X	X	X			X	X

C. Principles of Operation.

1. How do the components work together to achieve the system's function?
2. Using a line diagram of this system, identify the location of the major components.
3. Using a line diagram, indicate alignment for the following:
 - a. Receiving potable water
 - b. Transferring potable water
 - c. Ship's service normal distribution

4. State the proper storage, handling and use of:
 - a. Bromine Cartridges
 - b. Calcium Hypochlorite
5. What are established limits and testing frequencies for the following items:
 - a. Chlorine
 - b. Chloride
 - c. Bromine
 - d. PH
6. State the treatment procedures for potable water using the following methods:
 - a. In-line brominator
 - b. Recirculating brominator
 - c. Batch method

D. Parameters/Operating Limits. For the designated items, answer the following questions:

Column A represents "What is the normal operating value?"

Column B represents "What are the allowable operating limits?"

Column C represents "Where are the parameters sensed or monitored?"

Column D represents "Where is the physical location of the indicators?"

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1. Pump discharge pressure	X	X	X	X
2. Relief valve lifting pressure	X		X	
3. Hydropneumatic Tank Air Pressure	X	X	X	
4. Hot water heater outlet temp	X	X	X	X
5. P/W tank levels	X	X	X	X

E. System Interface.

1. How does loss of electrical power effect the operation of this system?
2. How does this system interface with the Bromine Feed System?

SECTION 1216 - DISTILLING PLANT SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 220, 531.
3. Manufacturer's Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following:

- | | |
|------------------------|------------------------|
| 1. Distillation | 7. Distillate |
| 2. Evaporation | 8. Brine |
| 3. Condensation | 9. Potable water |
| 4. Feed | 10. Salinity cell |
| 5. Vapor | 11. Salinity indicator |
| 6. Feedwater Treatment | |

C. Explain the basic difference between the following types of distilling systems:

1. Flash
2. Low-pressure submerged tube
3. Vapor-compression
4. Reverse Osmosis

D. State the restrictions for distilling potable water when astern of another vessel or when in close proximity to land.

E. System Components and Component Parts. State the function of the following system components and/or components parts.

- | | |
|--------------------------|-------------------------------|
| 1. Vapor separators | 12. Feed valve |
| 2. Distillate condenser | 13. Salinity indicator |
| 3. Air ejector condenser | 14. Solenoid valves |
| 4. Seawater heater | 15. Air ejectors |
| 5. Distillate pump | 16. Seawater feed pump |
| 6. Brine pump | 17. Distillate cooler |
| 7. Vacuum pump | 18. Automatic Dump Valve |
| 8. Relief Valve | 19. Air Eductor |
| 9. Temperature Regulator | 20. Overboard Discharge Valve |
| 10. Condensate Pump | 21. Suction Valves |
| 11. De Superheater | 22. Superheater |

F. Principles of Operation.

1. How do the above components work together to achieve the function of producing distillate?
2. Describe the flow path of circulating water from sea suction through the condensers, feed heaters, and distilling stages to overboard.
3. Describe the flow of steam vapor from the first stage through the vapor condensers to the distillate pump.
4. Describe the flow of steam from the reducer through the feed heater to the condensate system.
5. Describe the flow path of air and noncondensable gases from the air ejector condenser, distilling stages and feed heater through the vacuum pump to the atmosphere.

G. Parameters/Operating Limits. Provide the normal operating values and high/low limits of the following:

1. Temperature of each stage
2. System Vacuum
3. Waste heat inlet temperature
4. Steam Pressure
5. Feed water temperature to first stage
6. Salinity to tanks

H. System Interface. How do the following outside influences effect this system?

1. Loss of electric power.
2. Loss of steam pressure.
3. Reduced electric load.
4. Cold/Warm feed water.

I. Safety Precautions.

1. Why are there requirements for maintaining the 1st stage vacuum? What is the set value?

SECTION 1217 - SHIP SERVICE BOILER SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 220, 221, 255 VOL I & II
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system?

C. Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Each Boiler on cutter	X	X	X
2. Boiler Fuel Pump and Regulators	X	X	X
3. Fuel Solenoid Valve	X	X	
4. Feedwater Pumps	X	X	X
5. Piping	X	X	X
6. Coolers	X	X	X
7. Relief Valves	X	X	X
8. Make-up Feedwater Pump	X	X	X
9. Sight Glasses	X	X	X
10. Condensate Tank	X	X	X
11. Gauges	X	X	X
12. Steam Shoretie Connections	X	X	X
13. Electrical Controllers	X	X	X
14. Chemical Treatment	X	X	X
15. Magnetic Water Treatment (MWT)	X	X	X
16. Fuseable Plug	X	X	X
17. Fire Tube Boiler	X	X	X
18. Water Tube Boiler	X	X	X

D. Principles of Operation.

1. Explain how the above components work together to achieve system function.

E. Parameters/Operating Limits. For the designated items, answer the following questions:

Column A represents "What are the normal operating values and tolerances?"

Column B represents "Where/How are the parameters sensed and monitored?"

Column C represents "Where are the sensors/indicators mounted?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Steam Pressure	X	X	X
2. Fuel Pressure	X	X	X
3. Boiler Water Level	X	X	X
4. Condensate Tank Water Level	X	X	X
5. Air intake system/pressure	X	X	X
6. Exhaust system/pressure	X	X	X
7. Steam relief valve lifting pressure	X	X	

F. System Interface.

1. How do the following outside influences effect this system?

- a. Loss of electrical power.
- b. Loss of Auxiliary S/W pressure
- c. Loss of F/O boost system pressure
- d. Atmospheric pressure/Engine room vent changes.

2. Hoe does this system interface with the Feedwater system?

SECTION 1218 - WASTE HEAT RECOVERY SYSTEM

A. Reference Material.

1. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system?

C. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Water Level Control system	X	X	X
2. Feedwater Valve	X	X	
3. Feedwater Pump	X	X	
4. Chemical Treatment Injection Point	X	X	
5. Gauge Glass	X	X	
6. Duplex Return Unit	X	X	X
7. Immersion Heater	X	X	X
8. Vital Level Alarms	X	X	X
9. Steam Safety Valves	X	X	X
10. Steam Pressure Control System	X	X	X
11. Condensate Return System	X	X	X
12. Excess Steam Condensers	X	X	
13. Thermostatic Control Valve	X	X	

D. Principles of Operation.

1. Explain how the above components work together to achieve system function.
2. Define Latent Heat of Vaporization.
3. Define Ebullent Cooling (natural circulation).
4. Define forced circulation.

E. Parameters/Operating Limits.

1. List the minimum, maximum, and normal operating setpoints of the following:
 - a. Steam Pressure Valve
 - b. Back Pressure Valve
 - c. Excess Steam Valve
 - d. Water Level in Waste Heat Recovery Unit
 - e. Condensate Return Tank Level

F. System Interface.

1. How does a load increase or load decrease on the SSDG effect the system?
2. How does an increase or decrease in steam demand effect this system?
3. How does a loss of Ship service air effect this system?
4. How does this system interface with the Evaporator?
5. How does this system interface with the Feedwater System?

SECTION 1219 - REFRIGERATION SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 510 and 516
3. Manufacturers' Technical Publications, Ships's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following terms

- | | |
|-------------------------------|--------------------------------|
| 1. High Pressure side | 5. Super heat |
| 2. Low Pressure side | 6. Sensible heat |
| 3. Refrigerant | 7. Floodback |
| 4. British Thermal Unit (BTU) | 8. Latent Heat of Vaporization |

C. System Components and Component Parts. State the function and associated safety features of the following.

- | | |
|--|---------------------------------|
| 1. Compressor(s) | 14. Receiver |
| 2. Low-temperature switch | 15. King Solenoid valve |
| 3. Low L/O Pressure switch | 16. Thermostatic switch |
| 4. Relief valve | 17. Condenser |
| 5. Chilled water pump(s) | 18. Heat exchanger(s) |
| 6. Strainer(s) | 19. Dehydrator |
| 7. WRV valves | 20. EPR valves |
| 8. Thermostatic Switch | 21. Expansion valves |
| 9. Seawater reducing station | 22. High pressure cutout switch |
| 10. Water failure cutout switch | 23. Low pressure cutout switch |
| 11. Thermostatic expansion value (TXV) | 24. Compressor capacity control |
| 12. Evaporator (chiller/freeze box) | 25. Unloader |
| 13. Rupture Disk | 26. Hot Gas Circuit |
| | 27. Refrigerant Recycling |

D. Principles of Operation. Using your line diagram, describe the path of:

1. Refrigerant from the compressor discharge through the system and back to the compressor suction. (Indicating the places where it changes states)
2. Chilled water from the pump discharge through the system and back to the pump suction.
3. Defrost drainage.
4. Refrigerant emergency overboard relief.

E. Parameters/Operating Limits. For the following items, state the normal operating value and setpoints.

1. Chill box temperature
2. Freeze box temperature
3. Liquid line temperature
4. Compressor
 - a. Oil sump level
 - b. Suction Pressure/Temperature
 - c. Discharge Pressure/Temperature

F. System Interface.

1. How do the following outside influences effect this system:
 - a. Ambient temperature variations in supplied spaces.
 - b. Loss of electrical power.
 - c. Variations in cooling water pressure or temperature.
 - d. Loading Stores
 - e. Improper Sealing of Chill Box and Freezer Doors
2. How does this system interface with the Radar, Sonar and other installed weapon systems?
3. Discuss your cutter's unique lineup capabilities (i.e. hot gassing, charging, etc...).

G. Safety Precautions.

1. What special safety precautions apply to charging and handling refrigerant?
2. What special safety devices are associated with the chiller?
3. Become familiar with current refrigerant reclamation requirements?

SECTION 1220 - AIR CONDITIONING AND CHILLER SYSTEM

A. Reference Material.

1. NSTM Chapter 510
2. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system

C. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is it's function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. A/C Sea Water Pump	X	X	X
2. Chill Water Pump	X	X	X
3. Chill Water Loop Cross-Connect System	X	X	
4. Chilled Water Head Tanks	X	X	
5. Auxiliary S/W to A/C S/W Cross Connect	X	X	X
6. A/C Compressors	X	X	
7. Thermal Expansion Valve	X	X	
8. Chiller			
9. Heat Exchanger	X	X	
10. Condenser	X	X	
11. Electrical Controllers	X	X	X
12. Refrigeration Gas Systems	X	X	X
13. Chilled Water Expansion Tank	X	X	
14. Chiller low temperature cutout	X	X	X

D. Principles of Operation.

1. Using system line diagram, show the path of:
 - a. S/W from Seachest to Overboard.
 - b. Chilled Water from Suction to Discharge within the A/C Space.

E. Parameters/Operating Limits. For the designated items, answer the following questions:

Column A represents "What are the normal operating values and tolerances?"

Column B represents "Where/How are the parameters sensed and monitored?"

Column C represents "Where are the sensors/indicators mounted?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Suction Pressure/Temperature	X	X	X
2. Discharge Pressure/Temperature	X	X	X
3. Seawater Pressure	X	X	X
4. Chilled Water Inlet Temperature	X	X	X
5. Chilled Water Outlet Temperature	X	X	X
6. Chilled Water Outlet Pressure	X	X	X
7. Chilled Water Head Tank Pressure	X	X	X
8. Condensing Pressure/Temperature	X	X	X

F. System Interface.

1. How do the following outside influences effect this system?
 - a. Loss of Electrical Power.
 - b. Loss of Chilled Water Pressure.
 - c. Loss of S/W Cooling System Pressure.
2. How does this system interface with the Auxiliary S/W system?
3. How does the chill water system interface with the heating system?

G. Safety Precautions.

1. What are the general safety precautions that apply to this system?

SECTION 1221 - HEATING AND VENTILATION SYSTEM

A. Reference Material.

1. NSTM Chapters 510 and 512.
2. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. State the function of the following system components and component parts.

1. Forced Ventilation Units

- | | |
|-------------------------|----------------------|
| a. Ducting | e. Vent screens |
| b. Fans/blowers | f. Air filters |
| c. Motor controllers | g. Flash Arrestors |
| d. Ventilation closures | h. Piping and valves |

2. Vent Dust Heaters.

- | | |
|------------------|---------------|
| a. Access plates | c. Insulation |
| b. Heating coils | |

3. Steam Heaters

- | | |
|-------------------|----------------------|
| a. Supply valve | e. Access |
| b. Drain valve | f. Heating coil fins |
| c. Cabinet access | g. Steam trap |
| d. Coil fins | |

4. Grease Interceptor

- | | |
|--------------------------|-----------------|
| a. Damper control switch | c. Drain gutter |
| b. Trap | |

5. Electrical Unit Heaters

- | | |
|-----------------|---------------|
| a. Power supply | b. Unit coils |
|-----------------|---------------|

C. Explain how to set Positive and Negative ventilation in all Engineering Spaces.

D. Become familiar with your cutter's Ventilation Drawings as outlined in the Damage Control Book.

SECTION 1222 - ELECTRICAL DISTRIBUTION SYSTEM.

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapters 300, 302, 310, 320, 330, 400, and 491.
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. State the function of the following:

- | | |
|--|---------------------------------------|
| 1. Ships service generator | 16. Shore Power Breaker |
| 2. Generator switchboards | 17. Emergency Generator SWBD |
| 3. Bus Ties and breakers | 18. Vital/Non-Vital Circuits |
| 4. Distribution and load centers | 19. Generator breakers |
| 5. Emergency Generator | 20. Lighting Load Center |
| 6. Ammeter | 21. Voltmeter |
| 7. Frequency Meter | 22. Kilowatt Meter |
| 8. Synchroscope | 23. Voltage Regulator |
| 9. Manual Voltage Adjust Rheostat | 24. Automatic Voltage Adjust Rheostat |
| 10. Droop/Isochronous Switch | 25. Phase Sequence Indicator |
| 11. Generator Circuit Breaker | 26. Reverse Power relays |
| 12. Fuses | 27. Voltmeter Switch |
| 13. Circuit Breaker Mechanical Interlock | 28. Ground Detector Indicators |
| 14. Speed Control Potentiometer | 29. Synchronizing Mode Select Switch |
| 15. Automatic and Manual Bus Transfers | |

C. Principles of Operation.

1. Explain how the above components work together to achieve system function.
2. What are the sources of power for semi-vital and vital loads using ABTs and MBTs?
3. What components are served by the ABTs and MBTs?
4. What is the function of an ABT and MBT?
5. What are the principles of overcurrent devices (Time vs Amps)?
6. Explain how the 400HZ Distribution System functions, and how it interfaces with the 60HZ Distribution System.
7. Explain how generators operate in parallel in terms of voltage and frequency.

D. Parameters/Operating Limits. State the normal operating value & setpoints of the following:

- | | |
|---------------------------------------|-------------------------------------|
| 1. Ship's service generator frequency | 5. Ship's service generator voltage |
| 2. Emerg Gen voltage | 6. EDG frequency |
| 3. SSDG LOAD | 7. EDG/EGT LOAD |
| 4. Shore Tie Amperage | |

E. System Interface.

1. How do the following outside influences effect this system:
 - a. Loss of Shore Power
 - b. Loss of Cooling Water to on line unit
 - c. Load variations
2. How does this system support the propulsion plant?
3. Explain how this system interfaces with Ship's Lighting.
4. Explain how this system interfaces with the Weapons, Communications, and Navigation System.
5. What is loop current? Eddy Current? and Self existing/external excitation?

F. Protection Devices.

1. State the advantages of fuses vs circuit breakers.
2. What is single phasing? Loss of phasing?
3. What is the difference between marine and shore electrical systems? (i.e. Wye vs Delta Connections, ungrounded vs grounded, volt/amp relationship, power factor, 3 phase vs 1 phase power)

SECTION 1223 - ALARM PANELS SYSTEM

A. References:

1. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the basis for putting in an alarm system?

C. What are the drawbacks of operating a system with the alarm disabled or silenced?

D. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function and location?"

Column B represents "Identify the normal operation/mode."

Column C represents "Identify the alarm mode."

Column D represents "Describe the cutout/faulted condition."

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1. Fire and smoke alarm panel	X	X	X	X
2. Weapons annunciator	X	X	X	X
3. Light alarm panel	X	X	X	X
4. Two drop annunciator	X	X	X	X
5. Bilge Flooding Alarm Panel	X	X	X	X
6. Evaporator High Salinity	X	X	X	X
7. Gyro Compass Alarm	X	X	X	X
8. CO2 Flooding Alarm	X	X	X	X
9. Vacuum Sewage Alarm	X	X	X	X
10. Freezer	X	X	X	X
11. General, Chemical, Collision, Helo Crash	X	X	X	X
12. Boiler Alarm	X	X	X	X

E. System Interface.

1. How are the above systems effected by the loss of electrical power?

SECTION 1224 - INTERIOR COMMUNICATIONS SYSTEM

A. Reference Material.

1. NSTM Chapter 430
2. IC Electrician 3, NAVEDTRA 10559(series)
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "Which space does it serve?"

Column B represents "What is its function?"

Column C represents "From where is it powered and controlled?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Ships Telephone System	X	X	X
2. Sound Powered Telephones	X	X	X
3. 1MC	X	X	X
4. 21MC	X	X	X
5. Engine Order Telephone (EOT)	X	X	X
6. Emergency Bells	X	X	X
7. Salt and Pepper Line (X40J)	X	X	X
8. VHF Radio	X	X	X
9. Messenger	X	X	X
10. WIFCOM	X	X	X
11. Switchbox		X	
12. Jackbox		X	
13. Selector Switches		X	
14. Primary Circuit		X	
15. Auxiliary Circuit		X	
16. Supplementary Circuits		X	
17. E-call System	X	X	X

C. Define the following sound powered phone circuits:

- | | | |
|--------|--------|--------|
| 1. 2JV | 3. 2JZ | 5. 1JV |
| 2. 4JV | 4. JG | |

D. Become familiar with and explain how to use your cutter's Casualty Communications Diagram.

E. System Interface.

1. How does loss of electrical power effect the Interior Communications System?

SECTION 1225 - DEGAUSSING SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 475
3. Electrician's Mate 3 & 2 NAVEDTRA 10546
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following with regards to the ship:

- | | |
|-----------------------------------|---------------------|
| 1. Magnetic field | 6. Degaussing |
| 2. Permanent magnetization | 7. Degaussing range |
| 3. Induced magnetism | 8. Degaussing coils |
| 4. Earth's magnetic field | 9. Deperming |
| 5. Compass compensating equipment | |

C. Explain how deperming reduces permanent magnetization and brings all same class ships into a standard condition. Explain when deperming becomes necessary.

D. Explain how electrical current (DC) in degaussing coils forms a magnetic field that neutralizes the ship's permanent and induced magnetization.

E. Explain why the electric current in the various degaussing coils must be varied due to the ship's head and geographic location.

F. State the responsibilities of the Navigator and Engineer Officer in regard to the degaussing system.

G. System Components and Component Parts. State the function of the following system components and component parts:

- | | |
|----------------------|-------------------------------|
| 1. Degaussing folder | 5. Manual degaussing system |
| 2. "M" coil | 6. Auto degaussing system |
| 3. "FI" & "QI" coil | 7. Compass compensating coils |
| 4. "FP" & "QP" coil | |

H. Principles of Operation.

1. How is the proper current value of an individual degaussing coil determined using:
 - a. Manual degaussing
 - b. Automatic degaussing

I. System Interface.

1. How does this system interface with the ship's magnetic compass?

SECTION 1226 - GYROCOMPASS SYSTEM

A. Reference Material.

1. NSTM Chapter 252
2. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following:

1. Precession
2. Apparent rotation
3. Tumble

C. State the three degrees of freedom exhibited by a gyroscope.

D. Describe the effects of the earth's rotation on a free-spinning gyroscope.

E. Explain how corrective forces (torques) are generated and can change a gyroscope into a gyrocompass that accurately seeks/indicates true North.

F. Explain how roll and pitch information is generated by a gyrocompass and how this information is used.

G. System Components and Component Parts. State the function of the following system components and component parts.

- | | |
|-----------------------|----------------------------|
| 1. Master gyrocompass | 4. Repeater (s) |
| 2. Control cabinet | 5. Standby power supply |
| 3. Synchro amplifier | 6. Alarms and annunciators |

H. Parameters/Operating Limits.

1. What are the effects and time required for fast-settle versus normal-settle in gyrocompass start-up?

I. System Interface.

1. How does loss of electrical power effect this system?
2. How does this system interface with the following:
 - a. Fire Control Systems
 - b. Navigation Systems

SECTION 1227 - FIREMAIN SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 555
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system?

C. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Fire Pumps	X	X	X
2. Piping Valves	X	X	X
3. Relief Valve	X	X	X
4. Pressure Regulating Valve	X	X	X
5. Firemain Isolation Valves	X	X	X
6. Firemain Cross Connect Valves	X	X	X
7. Electrical Controllers	X	X	X
8. Automatic Regulating Valves	X	X	X
9. Strainers	X	X	X
10. Fire Stations	X	X	X

D. Principles of Operation.

1. How do the above components work together to achieve system function?
2. Where can the fire pumps be energized?
3. State the operating theory of the fire pumps' automatic pressure regulator valve.
4. State the alternative method for regulating Firemain pressure in the event that the automatic regulating valve fails.

E. Parameters/Operating Limits.

1. List the minimum, maximum, and normal operating setpoints of the following:
 - a. Firemain system pressure and flow rate.
 - b. Fire pump pressure and flow rate.
 - c. Shoretie pressure.
 - d. Fire monitor.
 - e. LP Air to Pressure Regulating Valve.

F. System Interface.

1. How do the following outside influences effect this system?
 - a. Loss of electrical power.
 - b. Energizing fire pump with F/M shoretie on the line.
 - c. Loss of LP Air.
2. How does this system interface with the following systems?
 - a. AFFF System
 - b. Magazine Sprinkler
 - c. Counter/Measure Washdown
 - d. Ballast/Deballast
 - e. Auxiliary Sea Water
 - f. Secondary Drainage
 - g. LP Air
 - h. Emergency Drainage

G. Safety Precautions.

1. What general safety precautions apply to this system?

SECTION 1228 - AFFF SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. NSTM Chapter 555
3. Damage Control Book and Drawings
4. Manufacturers' Technical Publications, Ships's Information Books, Casualty Control Manual, Ship's Drawings

B. What is the function of this system.

C. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is it's function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. AFFF Tank	X	X	X
2. Proportioner	X	X	X
3. Balancing Valve	X	X	X
4. Manual Bypass	X	X	X
5. Pressure Relief Valve	X	X	
6. Motor Operated Valves	X	X	X

D. Principles of Operation.

1. From what locations can this system be energized?
2. What is the ratio of foam solution to water?
3. What is the capacity of the AFFF Tank? How long will one full tank of foam last during operation (1 hose, 2 hose, etc.)?

E. System Interfaces.

1. How do the following outside influences effect this system?
 - a. Loss of electrical power.
 - b. Loss of firemain pressure.

F. Safety Precautions.

1. What general safety precautions apply to this system?

SECTION 1229 - AVIATION JP-5 FUEL SYSTEM

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. Shipboard - Helicopter Operational Procedures Manual, COMDTINST M3710.2
3. NSTM Chapter 542
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is it's function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
1. Service and Transfer Pumps	X	X	X
2. Service and Transfer Tanks	X	X	X
3. Filter Separators	X	X	X
4. GO-NO-GO Filter	X	X	X
5. Piping and Valves	X	X	
6. Fuel Meter	X	X	
7. Stripping and Recirculation Pump	X	X	X
8. Electrical Controllers	X	X	
9. HIFR Rig	X	X	X
10. Fuel Testing Kit	X		

C. Principles of Operation.

1. State how the above components work together to achieve system function.
2. State the importance of maintaining clean JP-5 fuel and the importance of recircing and stripping the service and storage tanks prior to servicing Helicopter.
3. List the equipment that is required when conducting a HIFR.
4. Become familiar with the procedures and safety precautions for conducting a HIFR, HOT FUEL, or normal refueling.
5. State the procedures for conducting JP-5 lab tests.
6. What is the Flash Point of JP-5?
7. State the requirements for using non-sparking tools in or near the vicinity of JP-5.

SECTION 1230 - MISCELLANEOUS AUXILIARY EQUIPMENT

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. Applicable NSTM Chapters; refer to Chapter 001, Publication Index.
3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Anchor Windlass

1. What is the function of this system (Wildcat Engaged v/s Wildcat Disengaged)?
2. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
a. Master Switch	X	X	X
b. Remote Push-button Station	X	X	X
c. Motor Controller	X	X	X
d. Wildcat Clutch Lever	X	X	X
e. Locking Pin	X	X	X
f. Wildcat Brake Handwheel	X	X	X
g. Bevel drive and driveshaft	X	X	X

3. Principles of Operation.

- a. State how the above components work together to achieve system function.
- b. Describe the following modes of operation:
 - (1) Electrical Control.
 - (2) Wildcat Clutch Control.
 - (3) Wildcat Brake Control.
 - (4) Electric Disc Brake Control.

4. Safety Precautions.

- a. What general safety precautions apply to this system?
- b. How is the load on a SSDG effected by Anchor Windlass operations?

C. Warping Capstan

1. What is the function of this system?
2. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
a. Capstan Head	X	X	X
b. Electric Motor	X	X	X
c. Disc Brake	X	X	X
d. Motor Controller	X	X	X
e. Motor Reducer	X	X	X
f. Bevel drive and drive shaft	X	X	X
g. Master Switch Control	X	X	X

3. Principles of Operation.
 - a. State how the above components work together to achieve system function.
4. Safety Precautions.
 - a. What general safety precautions apply to this system?
 - b. How is the load on a SSDG effected by system operation?

D. Motor Surfboat Davits.

1. What is the function of this system?

2. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
a. Wire rope falls and fittings	X	X	X
b. Davit arms	X	X	X
c. Hydraulic Cylinder and Ram	X	X	X
d. Hoist Winch	X	X	X
e. Payout Mechanism	X	X	X
f. Overriding Clutch and brake drum	X	X	X
g. Hydraulic Reservoir	X	X	X
h. Motor Operated Pump	X	X	X
i. Boat Grips	X	X	X
j. Keel skid/rest	X	X	X
k. Limit Switches	X	X	X
l. Hydraulic Flow Control Valves	X	X	X

3. Principles of Operation.

- a. State how the above components work together to achieve system function.

4. Safety Precautions.

- a. What general safety precautions apply to this system?
b. How is the load on a SSDG effected by system operation?
c. What is the normal hoisting weight of this system?

- E. Single Point Davit.

1. What is the function of this system?

2. System Components and Component Parts. For the designated items, answer the following questions:

Column A represents "What is its function?"

Column B represents "Where is it located?"

Column C represents "What are the safety/protective devices?"

	<u>A</u>	<u>B</u>	<u>C</u>
a. Mast	X	X	X
b. Base	X	X	X
c. Inner Boom/Outer Boom	X	X	X
d. Winch	X	X	X
e. Fairleader	X	X	X
f. Hydraulic Power Unit(Pump, Motor Reservoir, motor controller)	X	X	X

3. Principles of Operation.

- a. State how the above components work together to achieve system function.

4. Safety Precautions.

- a. What general safety precautions apply to this system?
b. How is the load on a SSDG effected by system operation?
c. What is the normal hoisting weight of this system?

SECTION 1301 - REQUIRED TASKS

	SIGNATURE/DATE
A. MAIN DIESEL ENGINE	
1. Prior to MDE start, line up the following systems: Sea water cooling, Start air, Lube oil, fuel oil, and jacket water.	_____
2. Energize Lube Oil and Jacket Water heaters.	_____
3. Pre lube the MDE.	_____
4. Check and add Lube Oil and Jacket Water to meet normal operational levels.	_____
5. Draw and test lube oil and jacket water samples.	_____
6. Check MDE rack settings	_____
7. Jack over MDE, using manual jacking gear.	_____
8. Blow down MDE.	_____
9. From cold iron, start (locally and remotely) the MDE.	_____
10. Monitor, familiarize and understand (low/normal/high limits), record, and respond to vital and normal operating parameters.	_____
11. Secure MDE and place in standby.	_____
B. SHIP SERVICE DIESEL GENERATORS	
1. Prior to engine (SSDG/EDG) start line up the following systems: sea water cooling, Start air, Lube oil, fuel oil, and jacket water.	_____
2. Energize Lube Oil sump and Jacket Water Heaters	_____
3. Pre lube the SSDG/EDG.	_____

4. Check and add Lube Oil and Jacket Water to meet normal operational levels. _____
5. Draw and test lube oil and jacket water samples. _____
6. Check switchboard for proper parameter settings prior to start up. _____
7. Check and add oil to the governor. _____
8. From cold iron, start (locally and remotely) the SSDG or EDG. _____
9. Monitor, familiarize and understand (low/normal/high limits), record, and respond to vital and normal operating parameters. _____
10. Secure generator and place in standby. _____

C. PROPULSION SHAFTING, BEARINGS, PROPELLERS AND REDUCTION GEAR

1. Line up valves and add lube oil to the reduction gear. _____
2. Check level and add Hydraulic Oil to the CPP sump. _____
3. Line up Sea water cooling valves. _____
4. Energize Lube Oil heater _____
5. Line Up clutch air system _____
6. From the lock position, engage, disengage, and turn the shaft via the turning gear. _____
7. Clutch in the shaft. _____
8. Operate CPP controls _____
9. Operate Main Propulsion in Pilot House, Local, and Emergency Control. _____

10. Answer Engine Order Bells (document properly). _____
11. Monitor reduction Gear and Line Shaft Bearing temperatures. _____
12. Explain "**Do Not Energize**" how to inflate stern tube seal. _____

D. STEERING GEAR SYSTEM

1. Operate steering gear unit in all modes (from after steering and the pilot house). _____
2. Add hydraulic oil to the system. _____
3. Shift steering control to after steering. _____
4. Conduct drills and operate emergency steering equipment. _____

E. SEAWATER COOLING

1. Line up equipment to be serviced, start pump, maintain psi, and secure system. _____
2. Shift seachest strainers. _____
3. Feed the seawater cooling system via the firemain cross connect (reduce psi accordingly). _____

F. FUEL AND LUBE OIL SYSTEMS

1. Line up and transfer fuel from the fuel storage tanks to the fuel service tanks via the Fuel oil coalescer and Fuel oil purifier. _____
2. Line up and transfer fuel from one storage tank to another. _____
3. Recirculate fuel oil service tanks via the FOP. _____
4. Line up and add lube oil to the MDE, SSDG, RED GEAR, etc. _____

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5. Line up and recirculate a MDE, SSDG, or RED GEAR lube oil sump via the LOP. _____
6. Start, operate, secure, and clean the Fuel oil and Lube oil purifiers'. _____
7. Take L/O samples on the MDE, SSDG, and RED GEAR; perform visgauge test, and record results. _____
8. Supervise the onloading of fuel oil and lube oil. _____
9. Perform a clear and bright test prior to accepting on load of fuel. _____
10. Locate and demonstrate ability to activate Emergency fuel cut out valves. _____

G. COMPRESSED AIR SYSTEM

1. Start, place in automatic, and secure an air compressor. _____
2. Line up compressor to equipment to be serviced. _____
3. Blow down air receiver. _____
4. Cross connect ship service air to diesel start air and vice versa. _____
5. Check level and add lube oil to an air compressor. _____

H. BALLAST SYSTEM

1. Ballast/deballast a designated ballast tank or fuel tanks that serve the dual purpose of fuel storage and ballasting. _____
2. Perform Fuel Oil and Water King duties _____
3. Sound both fuel and ballast tanks and accurately read the sounding tape. _____

4. Take forward and aft draft readings. _____
5. Demonstrate ability to maintain correct trim without list. _____

I. MAIN/SECONDARY DRAINAGE SYSTEMS

1. Locate, and demonstrate "Do not Energize" how to line up and operate each fixed eductor throughout the ship. NOTE: if an eductor is lined up improperly, a space can be flooded instead of dewatered. _____
2. Line up, and pump bilges (any compartment with the capability) overboard via the OWS or directly to the Dirty Oil Tank. _____
3. Start, operate, monitor, and secure the OWS. _____

J. SEWAGE COLLECTION, HOLDING, AND TRANSFER (CHT) SYSTEM

1. Pump (manually/automatically) grey water from the grey water tank(s) to the Sewage Holding Tank or overboard. _____
2. Shift Sewage Holding Tank discharge from overboard to shoretie and vice versa. _____
3. Pump Sewage Holding Tank overboard or to shoretie. _____
4. Flush the Holding Tank and shoretie with auxiliary sea water. _____
5. Reset Grey Water and Sewage Holding Tank High level Alarms in the event of power outage. _____
6. Shift grey water from overboard to holding tank. _____
7. Place sewage holding tank in retention prior to leaving and/or entering port. _____

8. Demonstrate ability to restore system vacuum. _____
9. Operate Vacuum sewage alarm and control panels. _____

K. POTABLE WATER SYSTEM

1. Line up valves and shift from (ship's pressure) to shore tie pressure and vice versa. Fill tanks and pressurize system. _____
2. Sample and test potable water tanks and borminate tank. _____
3. Line up and add water to P/W tanks via the evaporator. _____
4. Line up and add water to P/W tanks via shortie. _____
5. Recharge pressure tank (hydropneumatic tank) _____
6. Operate hot water heater in all modes. _____

L. DISTILLING PLANT

1. Line up, start, operate and secure the evaporator (transferring water to a potable water tank). _____
2. Add the proper amount of chemical treatment to the evaporator chemical tank. _____
3. Demonstrate ability to troubleshoot:
 - a. High/Low Distillate Level _____
 - b. High/Low Brine Level _____
 - c. High/Low Coordinate Level. _____

M. BOILER / WASTE HEAT RECOVERY UNIT

1. Line up, start, regulate, and secure an auxiliary boiler or Waste Heat Recovery Unit. _____

2. Demonstrate ability to regulate steam pressure.
3. Add chemical treatment.
4. Monitor system parameters.
5. Perform Boiler water tests.
6. Blow down a boiler and/or WHRU.

N. REFRIGERATION

1. Using the prescribed method add refrigerant to a refrigeration unit.
2. Start, operate, secure, and reset the refrigeration unit (includes hot gassing).
3. Demonstrate ability to shift compressors.
4. Demonstrate ability to shift receivers.
5. Monitor system parameters.

O. HEATING, VENTILATION, AND AIR CONDITIONING

1. Line up, start, and secure A/C unit.
2. Bring second A/C unit on line.
3. Add prescribed refrigerant gas to A/C unit.
4. Reset A/C unit in the event of a power failure.
5. Shift Hotel circuit from heating to cooling and vice versa. Make required adjustments to heating/cooling coils in each fan space, preheaters, and reheaters.
6. Shift from electric ship's heating mode to underway (steam) heating mode.

7. Locate and control supply, exhaust and recirculating fans/motors, and identify the spaces each serves. _____
8. Demonstrate ability to set positive or negative ventilation in the event of a component fire. _____

P. ELECTRICAL DISTRIBUTION SYSTEM

1. Detect and isolate electrical grounds _____
2. Shift from shore power to ship power and vice versa. _____
3. Physically connect and disconnect the electrical shore tie cables (following all safety precautions). _____
4. Place a generator (SSDG and EDG):
 - a. in electrical standby _____
 - b. in Parallel _____
 - c. balance electrical load _____
 - d. Single Up _____
 - e. operate in split plant _____
5. Energize, shift, and secure M/G sets. _____
6. Demonstrate ability to reduce electrical overload of Generators. _____
7. Demonstrate ability to operate a multimeter and megger. _____

Q. ALARM PANELS SYSTEM

1. Demonstrate ability to monitor, acknowledge and investigate ships alarms (Flooding, High Temp, Gyro Failure, Fire & Smoke, Vacuum Sewage). _____

2. Locate and replace blown fuses.
3. Test alarm panels.
4. Reset alarm panels in the event of a power failure.

R. INTERIOR COMMUNICATIONS

1. Demonstrate your ability to troubleshoot and repair sound powered telephones.
2. Conduct a continuity test on a phone circuit to determine open or shorted circuits.
3. Conduct a sensitivity test on a sound powered phone headset.
4. Rig and restore communications via a Salt and Pepper (X40J) hook up.
5. Demonstrate ability to establish comms from the engine room to the pilot house by all means.

S. DEGAUSSING SYSTEM

1. Energize, operate, and secure degaussing system

T. GYROCOMPASS

1. Energize and secure your cutter's various Gyro Compasses.
2. In the event of a power failure, demonstrate ability to reset system.

U. FIREMAIN

1. Start, monitor, and secure (locally and remotely) each fire pump.
2. Demonstrate ability to segregate system.
3. Regulate firemain pressure.

4. In the event that each fire pump fails, demonstrate ability to provide Firemain pressure via alternate means (P-250, ASW).

V. AFFF

1. Line up, start and secure (locally and remotely) the AFFF system.
2. Demonstrate ability to regulate the AFFF By Pass Valve manually.
3. In the event of electrical failure, demonstrate ability to open AFFF (electrical) supply valves manually.

W. AUXILIARY EQUIPMENT

1. Start, operate, and secure the following systems:
- a. anchor windlass
 - b. motor surfboat davits
 - c. articulating crane
 - d. warping capstan
 - e. single point davit

- X.** Complete the Personnel Qualification Standard for Basic Damage Control (NAVEDTRA 43119-2) within six months of reporting aboard.

- Y.** Complete the Scene Leader and Repair Party Leader Sections of Advanced Damage Control Emergency Parties Personnel Qualification Standard (NAVEDTRA 43119-3).

Z. CASUALTY CONTROL

1. Demonstrate ability to recognize and associate casualty symptoms on the respective machinery and systems outlined in the Casualty Control Manual.

2. At the following positions, successfully demonstrate proficiency in executing initial response and remedial action procedures for the machinery and systems outlined in the Casualty Control Manual.

a. Oiler

b. Throttleman

c. Engineer of the Watch

AA. QUALIFY AS INPORT EOW

BB. QUALIFY AS UNDERWAY EOW

COMPLETION RECORD OF PART 1

FUNDAMENTALS

SIGNATURE/DATE

1101	Mechanical Fundamentals	_____
1102	Electrical Fundamentals	_____
1103	Safety Fundamentals	_____
1104	Hydraulic Fundamentals	_____
1105	Electric Drive Propulsion Fundamentals	_____
1106	Welding and Cutting Fundamentals	_____
1107	Casualty Control Fundamentals	_____

SYSTEMS

1201	Required Line Drawings	_____
1202	Diesel Engine System (MDE, SSDG, EDG)	_____
1203	Gas Turbine System	_____
1204	Gas Turbine Air Intake and Exhaust System	_____
1205	Propulsion Shafting, Bearings, Propellers and Reduction Gear Systems	_____
1206	Controllable Pitch Propeller System	_____
1207	Steering System	_____
1208	Diesel Engine Jacket Water System (MDE, SSDG)	_____
1209	Seawater Cooling System	_____
1210	Fuel Oil and Lube Oil Systems	_____
1211	Compressed Air System (Low Pressure, High Pressure and Starting Air)	_____

SYSTEMS (cont'd)**SIGNATURE/DATE**

- | | | |
|------|---|-------|
| 1212 | Ballast, Deballast, and Stripping Systems | _____ |
| 1213 | Bilge Drainage Systems | _____ |
| 1214 | Sewage Collection, Holding, and Transfer (CHT) System | _____ |
| 1215 | Potable Water System | _____ |
| 1216 | Distilling Plant System | _____ |
| 1217 | Ship Service Boiler System | _____ |
| 1218 | Waste Heat Recovery System | _____ |
| 1219 | Refrigeration System | _____ |
| 1220 | Air Conditioning and Chiller System | _____ |
| 1221 | Heating and Ventilation System | _____ |
| 1222 | Electrical Distribution System | _____ |
| 1223 | Alarm Panels System | _____ |
| 1224 | Interior Communications System | _____ |
| 1225 | Degaussing System | _____ |
| 1226 | Gyrocompass System | _____ |
| 1227 | Firemain System | _____ |
| 1228 | AFFF System | _____ |
| 1229 | Aviation JP-5 Fuel System | _____ |
| 1230 | Miscellaneous Auxiliary Systems | _____ |

PRACTICAL FACTORS

- | | | |
|------|----------------|-------|
| 1301 | Required Tasks | _____ |
|------|----------------|-------|

PART 2

SECTION 2101 - DAMAGE CONTROL ASSISTANT SCHOOL

- A. **DAMAGE CONTROL ASSISTANT.** Upon completion of Part "1", the EOIT shall attend Damage Control Assistant (DCA) School (A-4G-0020). A prospective Engineer Officer (EO) is required by COMDTINST M3502.4, Cutter Training and Qualification Manual, to successfully complete DCA School prior to assignment as EO on the following cutter classes: WAGB, WHEC, WMEC, WTGB, WLB, and WLM. DCA School is also a prerequisite for holding the position of Damage Control Assistant. Completion of DCA School shall be documented within the EOIT's Officer Evaluation Report (OER) and form CG-4082, Officer Educational Record.

DATE OF COMPLETION

SIGNATURE

PART 3

SECTION 3101 - ENGINEERING ADMINISTRATION FUNDAMENTALS

A. References Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. MLCP and/or MLCA Standing and Operating Procedures
3. Cutter Organization Manual (COM)
4. NSTM Chapter 074, Vol 3
5. Engineering Dept Organization & Regulations Manual
6. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings.

B. Become familiar with the content of the following documents:

1. Cutter Organization Manual (COM)
2. Engineering Dept Organization and Regulations Manual
3. Standard Operating Procedures (SOP)
4. Casualty Control Manual
5. Main Space Firefighting Doctrine
6. PMS Manuals for Main Propulsion, Auxiliary, Electrical, and Damage Control
7. Damage Control Books and Drawings
8. Ship's Information Books
9. EO Standing Orders
10. Training and Education Manual, COMDTINST M1500.10
11. Cutter Training and Qualification Manual, COMDTINST M3502.4
12. Supply Policies and Procedures Manual, COMDTINST M4400.19
13. Safety and Environmental Health Manual COMDTINST M5100.44
14. Directives Publications and Reports Index, COMDTNOTE 5600

C. State the duties of the following as defined in the COM.

- | | |
|------------------------------|---|
| 1. Commanding Officer | 8. Executive Officer |
| 2. Engineer Officer | 9. Officer of the Deck |
| 3. Main Propulsion Assistant | 10. Damage Control Petty Officer |
| 4. Auxiliary Assistant | 11. Engineering Admin Assistant |
| 5. Electrical Officer | 12. Damage Control Assistant |
| 6. Damage Control Officer | 13. Gas Free Engineer |
| 7. Safety Officer | 14. Engineer Officer of the Watch (EOW) |

D. For all watchstations listed below, explain the duties and responsibilities as defined in the Engineering Dept Organization & Regulations Manual and discuss the reporting responsibilities of the watchstander to the OOD and or EOW:

1. EOW
2. Sounding and Security Watch
3. Throttleman
4. Auxiliary Watch
5. Fuel Oil and Water King

6. Duty Damage Controlman
 7. Duty Electrician
 8. Damage Control Petty Officer
- E. How are changes (and reliefs) to the watchbill indicated for each Watch Quarter and Station Bill condition? (i.e. GQ, Special Sea Detail, Man Overboard, etc.)
- F. Explain the procedures required to permit underwater work by divers, personnel going aloft and over the side, jacking the shaft, exercising rudders, and entering tanks and voids.
- G. Describe the steps required to obtain permission to start/test major machinery in port.
- H. State the purpose of the Machinery Space Firefighting Doctrine (MSFD). Explain the sequence of events in your MSFD.
- I. State the purpose of the following logs/reports: Which are legal records?
1. Bell Log/Data Log
 2. Engine Operating Record
 3. Engineer Officer's Standing Orders
 4. Distilling Plant Operating Log
 5. Refrigeration/Air-Conditioning Equipment Operating Log
 6. Fuel and Water Report
 7. Fueling Record
 8. Engineer Officer's Night Order Book
 9. Heat Stress Survey
 10. Tag-out Log
 11. Damage Control (DC) Closure Log
 12. Cathodic Protection Log (Zinc log)
 13. Diesel Engine Maintenance Program (DEMP) log
 14. Water Chemistry Log
 15. Lite Off and Securing Schedule
 16. Cutter Engineering Report
 17. End of Patrol Summaries
 18. Boat Inspection Reports
 19. Underwater Body Inspection Report
 20. Quarterly Energy Consumption Report
 21. Quarterly Energy Cost Report
 22. Post Availability Reports
 23. Machinery History Files
 24. Hull History Files
 25. Gyro Maintenance Log
 26. Degaussing Log
 27. Gas Free Engineering Log
 28. Letter of Full Power Trial
 29. J/W Test Log
 30. Zinc Log

J. State the purpose of the following:

1. Electrical Safety Programs
2. Diesel Engine Maintenance Program (DEMP)
3. Engineering Casualty Control Training Team (ECCTT)
4. Gas-Free Engineer
5. Gauge Calibration Program
6. PMS Program
7. CSMP Program
8. ShipAlt Program
9. Heat Stress Program
10. Respiratory Program
11. Hearing Conservation Program
12. Material Safety Data Program
13. Eye Protection Program
14. Hazardous Material Control Program
15. Hot Work Safety Program
16. Machinery/Equipment/Tool Safety Program
17. Damage Control Petty Officer Program
18. Long Range Maintenance Program
19. Cutter Class Maintenance Program

K. Explain the following as applied to the equipment safety tag-out system:

1. Duties of authorizing officer, person attaching tag, person checking tag and repair activity.
2. Use of Caution Tag/Danger Tag.
3. Out-of-calibration label.
4. Out-of-commission label.
5. Location and custody of tag-out log on your ship for both Engineering and Operations.
6. Function of tag-out log audit.
7. Equipment/conditions requiring Commanding Officer's permission.
8. Independent checks by the person attaching the tag and person checking the tag. (i.e. 1st person hangs all the tags, then the 2nd person does their check)

L. Explain your ship's restricted maneuvering policy.

SECTION 3102 - STABILITY AND BUOYANCY FUNDAMENTALS

A. References Material.

1. NSTM Chapter 079, VOL I & II
2. Repair Party Manual
3. Naval Engineering Manual, COMDTINST M9000.6
4. Damage Control Book and Drawings
5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings.

B. Define the following terms, and discuss how they effect and relate to cutter stability:

- | | |
|-----------------------------|--|
| 1. Displacement | 24. Center of Buoyancy |
| 2. Volume | 25. Center of Gravity |
| 3. Density | 26. Force |
| 4. Weight | 27. Solid flooding |
| 5. Buoyancy | 28. Loose water |
| 6. Trim | 29. Free surface effect |
| 7. Stability | 30. Free communication effect |
| 8. Moment | 31. Maximum Load Condition |
| 9. Displacement | 32. Force of gravity |
| 10. Draft | 33. Center of buoyancy |
| 11. Calculative draft marks | 34. Navigational draft marks |
| 12. Force of buoyancy | 35. Reserve buoyancy |
| 13. Mean draft | 36. Center of flotation |
| 14. Heel marks | 37. Overall stability |
| 15. Freeboard | 38. Righting moment |
| 16. Trim | 39. Righting arm |
| 17. Pitch | 40. Metacenter |
| 18. Limiting draft marks | 41. Metacentric height (positive & negative) |
| 19. List | 42. Danger angle |
| 20. Roll Period | 43. Floodable Length |
| 21. Free Surface | 44. Yaw |
| 22. Lolling | 45. Ice buildup |
| 23. Wind | 46. Minimum Load Condition |

C. Describe the use and mechanics of the inclining experiment.

D. Discuss changes of trim and its effect on overall stability.

E. Identify the effects on transverse and/or longitudinal stability when the following are applied to liquid load and/or solid load (cargo, equipment):

- | | |
|---------------------|------------------|
| 1. Weight additions | 3. Weight shifts |
| 2. Weight removals | |

- F. Define the following methods of correcting list and trim caused by unequal weight distributions:
1. Ballasting
 2. Jettisoning Weights
 3. Counter-flooding
 4. Lower solid weights
- G. State the most common causes of flooding.

SECTION 3103 - TRAINING FUNDAMENTALS

A. Reference Materials.

1. Cutter Organization Manual (COM)
2. Master Training Plan (TQC)
3. Cutter Training & Qualifications Manual, COMDTINST M3502.4
4. Training & Education Manual, COMDTINST M1500.10

B. Define the following types of training:

- | | |
|--|---|
| 1. PQS | 10. On-the-job training |
| 2. Tailored Ship's Training Availabilities (TSTAs) | 11. Striker program |
| 3. Team Training | 12. Drills |
| 4. Divisional training | 13. Battle problems |
| 5. Training Teams(DCTT, ECCTT) | 14. Fast Cruise |
| 6. Correspondence courses | 15. Training and Readiness Evaluation (TRE) |
| 7. Standard Training Requirements (STRS) | 16. Command Assessment Of Readiness & Training (CART) |
| 8. Departure Readiness Exams (DERE) | 17. Resident Training Courses |
| 9. Training Availability (TRAV) | 18. Fleet Exercises (FLTEX) |
| | 19. Phase III Helo Training |

C. List the members and functions of the Training Board.

D. State the responsibilities of the following personnel in developing the department/division training plan:

- | | |
|---------------------|----------------------|
| 1. Division Officer | 5. Department Head |
| 2. CPO/LPO | 6. Training Officer |
| 3. Safety Officer | 7. Executive Officer |
| 4. Medical Dept Rep | 8. DCA |

E. State the purpose, content and procedures for completing the following records:

1. Quarterly Training Plan
2. Divisional Training Plan
3. Watch Qualifications Record/Board
4. Individual Training Record (ITR)

- F. Explain how the department maintains records of personnel qualification in the following:
- | | |
|----------------------------|------------------------------|
| 1. Watchstanding | 4. Basic Damage Control |
| 2. Advanced Damage Control | 5. Repair Locker Team Member |
| 3. First Aid | 6. Helo Firefighting |
- G. Ensure Engineering personnel meet the training and PQS requirements for their assigned billets and watch stations.
- H. Explain how to properly document (i.e. letter, CG-3307 Admin Remarks, Officer Educational Record CG-4082) PQS qualification.
- I. Explain the process for ensuring that PQS qualifications are filed within your Personnel Data Record (PDR) and forwarded to your respective PERSU and Commandant (G-PIM-2).
- J. What is the difference between a JQR (Job Qualification Requirement) and PQS? PQS and formal schooling?

SECTION 3104 - CORRESPONDENCE FUNDAMENTALS

A. Reference Materials

1. Cutter Organization Manual (COM)
2. Standardized Subject Identification Codes (SSIC) Manual, COMDTINST M5210.5
3. Correspondence Manual, COMDTINST M5216.4
4. Naval Engineering Manual, COMDTINST M9000.6
5. Directives, Publications & Reports Index, COMDTNOTE 5600

B. State the purpose of the following types of correspondence:

- | | |
|--------------------|---------------------|
| 1. Basic Letter | 3. Rapidraft Letter |
| 2. Business Letter | 4. Memorandum |

C. Explain the procedures for drafting the following correspondence:

- | | |
|-----------------------|------------|
| 1. CASREP | 4. SHIPALT |
| 2. BOATALT | 5. LOGREQ |
| 3. PMS Change Request | 6. ORDALTS |

D. State the departmental routing of letter and memo from drafter to mailing.

E. Describe the ship's routing procedure for incoming correspondence.

F. State the purpose of the Standard Subject Identification Code (SSIC).

G. Define the following:

- | | |
|-------------|--------------|
| 1. Routine | 3. Immediate |
| 2. Priority | 4. Flash |

H. What is the function of a date/time group on a message?

I. State who has "releasing" authority on board your cutter.

J. Discuss "minimize" and its effects on normal traffic.

K. Discuss the purpose and use of address indicating groups.

L. Explain the meaning of "By Direction Authority."

SECTION 3105 - COUNSELING FUNDAMENTALS

- A. Reference Materials.
1. Personnel Manual, COMDTINST M1000.6
 2. Leave and Earnings Statement (LES)
 3. PMIS/JUMPS Manual Vol I (Field Unit), COMDTINST M1080.7
 4. Medals and Awards Manual, COMDTINST M1650.25
- B. Become familiar with the content of the following instructions and manuals:
1. Personnel Manual, COMDTINST M1000.6
 2. U. S. Coast Guard Regulations, COMDTINST M5000.3
 3. Training and Education Manual, COMDTINST M1500.10
 4. Military Justice Manual, COMDTINST M5810.1
 5. Uniform Code of Military Justice
- C. Define the Selected Reenlistment Bonus (SRB) system zone "A" and "B" requirements.
- D. Explain how to fill out and route an Assignment Data Card (CG-3698A) "Dream Sheet".
- E. Discuss the procedure required to request the following:
1. "A" School/"C" School
 2. Officer Candidate School
 3. Tuition Assistance
 4. PG/Advanced Training
- F. Discuss the information contained in a Leave and Earnings Statement (LES).
- G. What is the CG's policy on indebtedness and financial responsibility?
- H. What assistance can be obtained from the following:
1. Navy Relief Society
 2. American Red Cross
 3. Mutual Assistance Officer
 4. Family Service Center
 5. Morale Officer
 6. Employee Assistance Program
 7. Work Life Office
- I. Discuss the general eligibility discharge requirements for the following:
1. Hardship
 2. Humanitarian

- J. Discuss the sequence of events when processing the following requests:
1. Leave (normal/emergency)
 2. Standby/Exchange of duty
 3. Hardship Transfer
 4. Request Mast
 5. Humanitarian Transfer
- K. State the process for recommending an individual for an award.
- L. What are the responsibilities of a Command Enlisted Advisor (CEA)?
- M. What is a Report of Offense and Disposition, CG-4910?
- N. What are the responsibilities of a Mast Representative?
- O. What are the responsibilities of a Preliminary Inquiry Officer?
- P. Explain the duties of the Commands OMBUDSPERSON.
- Q. Explain the Commandant's policy on Human Relations, Sexual Harassment, and Equal Opportunity.
- R. Become familiar with the content of the CG Institute Division Officer Course.
- S. Become familiar with procedures for enlisted personnel advancement, enlisted personnel evaluations and administrative remarks.

SECTION 3106 - LOGISTICS AND FINANCIAL MANAGEMENT FUNDAMENTALS

A. Reference Materials.

1. Supply Policy and Procedures Manual, COMDTINST M4400.19
2. Naval Engineering Manual, COMDTINST M9000.6
3. MLC Standing and Operating Procedures
4. Small Purchase Handbook, COMDTINST M4200.13
5. Afloat Supply Procedures Manual, NAV PUB 485
6. Afloat Shopping Guide, NAVSUP 4400

B. What is the reason for having such a system?

C. Explain the importance of Configuration Management and the effects of a configuration change on:

- | | |
|----------------------------|------------------------|
| 1. Storeroom Allowance | 4. CALMS |
| 2. Equipment Maintenance | 5. Casualty Response |
| 3. Technical Documentation | 6. Alteration Planning |

D. Discuss the consequences of uncontrolled or undocumented configuration changes.

E. Describe control procedures for the receipt and storage of supplies during both working and non-working hours.

F. Define the following:

- | | |
|---|---|
| 1. Equipment | 17. Federal Stock Number (FSN) |
| 2. Equipage | 18. National Stock Number (NSN) |
| 3. Repair parts | 19. COG Number |
| 4. Consumables | 20. Allowance Part List (APL) |
| 5. CALMS/COSAL | 21. Allowance Equip List (AEL) |
| 6. Mandatory turn-in items | 22. Cage number |
| 7. SCAMP | 23. Auto Requisition Mgmt (ARM) |
| 8. Allowance Change Request (NAVSUP 1220-2) | 24. Report of Discrepancy (ROD) (SF-364) |
| 9. DD-1149 | 25. Recommended Allowance |
| 10. Mandatory Allowance | 26. General Purpose Property |
| 11. Allowance | 27. Configuration Change Form (OPNAV 4790/CK) |
| 12. Stock Record Card (NAVSUP 1114m) (NAVSUP 1114m) | 28. Shipboard Parts Requisition (NAVSUP 1250-1) |
| 13. MILSTRIP (DD-1348) | 29. ERPAL |
| 14. BOSS | 30. Warranty Notice |
| 15. Centralized Shipboard Supply (CSS) | 31. Government Furnished Equipment/Material |
| 16. GSA Schedule | |

G. Explain the policy of the Uniform Material Movement and Issue Priority System (UMMIPS).

H. Explain the Allowance Change Approval Process.

- I. State the proper method of entering and using the following:
 - 1. GSA Stock Catalogue
 - 2. Afloat Shopping Guide (ASG)
- J. State the purpose and content of all the supply forms used for ordering parts/services.
- K. State the step by step procedures for ordering and procuring material through the ship's supply organization.
- L. Discuss the types, methods, and procedures for tracking outstanding requisitions in material procurement.
- M. State the conditions under which material can be surveyed and the procedures for documenting the survey.
- N. Discuss the methods a Division Officer can utilize to improve the effective operation of material management within his/her shipboard supply organization.
- O. What is the difference in the requirements when ordering an item that costs less than \$100 and one that costs over \$1000?
- P. Develop a working knowledge of SCAMP, its functions, and the reports it generates. How does SCAMP interface with Centralized Shipboard Supply?
- Q. Explain the difference between AFC-30 and AFC-45 funds.
- R. Explain how to requisition parts via the CASREP system.
- S. Explain how to use CALMS, ERPAL, CCMPs, and BOSS as requisitioning guides.

SECTION 3201 - REQUIRED TASKS

SIGNATURE/DATE

A. ENGINEERING ADMINISTRATION.

1. Prepare and submit the following reports:

a. Cutter Engineering Report

b. End of Patrol Summary

c. Underwater Inspection Report

d. Quarterly Energy Consumption Report.

e. Quarterly Energy Cost Report

f. Boat Inspection Report

g. CSMP

2. Review, update, and maintain the following files:

a. Damage Control Closure Log

b. Diesel Engine Maintenance Program

c. Machinery History File

d. Hull History File (Assist 1ST LT

e. PMS Completion Status

f. SHIPALT/BOATALT Files

g. CSMP Files

h. Lube Oil Analysis

i. Machinery Log

j. Daily Fuel, Oil, and Water Report

k. CASREP FILE

l. Electrical Tag-Out Log

SIGNATURE/DATE

3. Certify a compartment/space as Gas Free and Safe for Hot Work. _____
4. Maintain the programs outlined in para J of Section 3101. _____
5. Draft a Navy Ship's Maintenance Action Form (2-KILO). _____
6. Draft a MISHAP Report _____
7. Coordinate maintenance with your MAT and Base Industrial. _____
8. Identify and prioritize Cutter Class Long Range Maintenance Plan _____

B. STABILITY AND BUOYANCY

1. Provide Commanding Officer with Daily Liquid Load Status. _____
2. Become familiar with Cutter Stability and Loading Data Booklet or DC Book. _____
3. Demonstrate proficiency in performing or supervising the following drills:
 - a. MOB-D-6-SF, Righting Ship _____
 - b. MOB-D-11-SF, Set Material Condition. _____
 - c. MOB-D-12-SF, Hull Damage _____
 - d. MOB-D-21-SF, Major Flooding _____
4. Demonstrate proficiency in executing the procedures of the Fuel Transfer and Ballast Bill and the Stability and Liquid Loading Instructions of your cutter. _____
5. Correct/restore cutter to correct trim and list. _____
6. Solve for your cutter's GM while in drydock and waterborne. _____

C. TRAINING

1. Successfully complete the formal school and Watchstation PQS/JQR/OJT requirements that are required to function in your assigned billet. _____
2. Develop, implement, and monitor the effectiveness of the Engineering Department and Unit Damage Control Weekly and Quarterly Training(drills, instruction) Plan. _____
3. Participate as a member of the Damage Control Training Team (DCTT) and the Engineering Casualty Control Training Team (ECCTT). _____
4. Ensure that Engineering Watchstanders and Repair Locker personnel are qualified in their assigned positions. _____
5. Maintain Department Training Records (Formal Schools, PQS, JQR, OJT). _____

D. CORRESPONDENCE.

1. Properly draft the following forms of correspondence.
 - a. Basic Letter _____
 - b. Business Letter _____
 - c. Rapid Draft Letter _____
 - d. Memorandum _____
 - e. CASREP/CASREP UPDATE/CASCOR _____
 - f. SHIPALT/BOATALT _____
 - g. PMS Change Request _____

E. COUNSELING

1. Evaluate Division Personnel; Enlisted Performance Evaluation Forms (EPEF), CG-3788 _____
2. Document adverse and commendable achievements on CG-3307, Administrative Remarks. _____
3. Ensure division personnel are aware of, familiar with, and have access to Coast Guard instructions that impact their career and well being. _____
4. Enforce Commandant Policies. _____

F. LOGISTICS & FINANCIAL MANAGEMENT

1. Draft a procurement request for the following amounts:
 - a. Under \$250 (SF1165) _____
 - b. \$1 to \$2499 _____
 - c. \$2500 to \$25,000 _____
 - d. Over \$25,000 _____
 - e. Sole Source Justification _____
2. Prepare and forward the following:
 - a. Shipboard Parts Requisition (NAVSUP 1250-1) _____
 - b. Allowance Change Request (NAVSUP 1220-2) _____
 - c. Report of Discrepancy (SF-364) _____
 - d. Stock Record Card (1114m) _____
 - e. Requisition and Invoice Shipping Document (DD-1149) _____

SIGNATURE/DATE

- f. MILSTRIP Requisition (DD-1348) _____
- 3. Draft a Divisional Budget and Spending Plan. _____
- 4. Prepare a Ship's Configuration Change Form, OPNAV 4790/CK for
 - a. Equipment Addition _____
 - b. Equipment Modification _____
 - c. Equipment Removal _____
 - d. Equipment Relocation _____

COMPLETION RECORD OF PART 3

FUNDAMENTALS

SIGNATURE/DATE

3101 Engineering Administrative Fundamentals

3102 Stability and Buoyancy Fundamentals

3103 Training Fundamentals

3104 Correspondence Fundamentals

3105 Counseling Fundamentals

3106 Logistics and Financial Management Fundamentals

PRACTICAL FACTORS

3201 Required Tasks

PART 4

SECTION 4101 - DECK WATCH OFFICER (DWO) TRAINING

- A. Chapter 6 of COMDTINST M3502.4C, Cutter Training and Qualification Manual, provides guidance for completing DWO Options 1 and 2.

1. Completed Option 1.

DATE OF COMPLETION

SIGNATURE

2. Completed Option 2

DATE OF COMPLETION

SIGNATURE

*
* **NOTE:** While completion of Option 2 is not required to be assigned as an *
* EO, it is strongly encouraged, and is necessary to become a fully *
* qualified underway OOD and to be listed in a cutter's Succession to *
* Command. In addition, completion of Option 2 enhances an *
* officer's competitiveness for future promotion opportunities, *
* including XO afloat. Completion of Option 2 is a prerequisite to *
* screen for command afloat. *

PART 5

SECTION 5101 - NAVAL ENGINEERING SUPPORT ORGANIZATION

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. MLCP and MLCA Standing and Operating Procedures

B. NAVAL ENGINEERING SUPPORT UNIT (NESU).

1. Describe the organizational structure of the NESU.
2. What are the primary functions and responsibilities of a NESU CO, XO, and cutter type desks.
3. Explain how a cutter, NESU, and MLC interface.
4. What type and degree of maintenance and logistic support do the NESUs provide Area cutters and boats, groups, and district cutters and boats?
5. What type funds are available at the NESU? How is funding allocated?
6. Explain the Annual NESU budget request process.
7. State the primary function of a Maintenance Augmentation Team (MAT) and Weapons Augmentation Team (WAT)? What is the process for requesting and coordinating MAT/WAT assistance for units?
8. What is the primary function of a Coast Guard Base Industrial? How are Work Orders processed? Who funds Base Industrial work?

C. MAINTENANCE AND LOGISTIC COMMAND MLC(v).

1. Describe the organizational structure of the MLC.
2. What is the function and primary responsibility of the following branches
 - a. MLC(vr), Support Branch
 - b. MLC(vad), Administration Branch
 - c. MLC(vs), Specification Branch
 - d. MLC(vpl), Procurement and Logistics Branch
 - e. MLC(t), Command Control and Communications Division
 - f. MLC(k), Health and Safety Division

3. What type of maintenance agreement exists between the MLCs and Navy Intermediate Maintenance Activities (IMAs). What is the process for coordinating ship repairs at a Navy SIMA?
4. What is a Military Interdepartmental Procurement Request (MIPR)? How are MIPRs used by the MLC?
5. State the purpose for developing and maintaining Cutter Class Maintenance Plans (CCMPs) and Long Range Maintenance Plans (LRMPs) for cutters and boats. Which support parties are responsible for maintaining and updating these plans?
6. Explain how the MLC coordinates repair availabilities with the Operational Commander.
7. State the purpose of the Top Ten Maintenance Program. Define the process for identifying Top Ten Maintenance Problems.
8. Explain how the Cutter Engineering Report is processed.
9. Explain how G-ENE and the MLCs interact.
10. Explain how the MLC allocates AFC-45 funds.
11. Explain the annual MLC budget request cycle.

D. HEADQUARTERS NAVAL ENGINEERING DIVISION (G-ENE).

1. Describe the organizational structure of G-ENE.
2. What is the function and primary responsibility of:
 - a. G-ENE-1, Type Support Branch
 - b. G-ENE-2, Fleet Systems and Equipment Branch
 - c. G-ENE-3, Resources Branch
 - d. G-ENE-5, Technical Branch
3. Explain G-ENE policy and procedures for developing, maintaining and revising the following:
 - a. Damage Control Books, Drawings, and CCOLs
 - b. Stability and Loading Data Booklets
 - c. PMS Manuals
 - d. Manufacturer Technical Publications

- e. Master Drawings, Selected Record Drawings
- 4. Define, state the purpose of, and identify who is required to serve on the following boards:
 - a. Ship Structure and Machinery Evaluation Board (SSMEB).
 - b. Machinery Evaluation Board (MEB).
 - c. Ship Structure Evaluation Board (SSEB)
 - d. Boards of Survey for Boats
- 5. Define and state the purpose of an Interservice Support Agreement (ISSA).
- 6. Define the Planned Obligation Program (POP).
 - a. State the purpose of this program.
 - b. How are project plans funded?
 - c. How are project plans classified and prioritized?
 - d. Who is responsible for developing project plans?
- 7. Define Resource Change Proposal (RCP), and the role RCPs play in the Annual Coast Guard Budget Request Process.
- 8. Who initiates RCPs for Naval Engineering?
- 9. Define the following funds: How are RCPs submitted for each? Does G-ENE control the fund? If not, what HQ division does? How are funds allocated to the MLCs, Districts, SCCB?
 - a. OE: AFC-30, AFC-45
 - b. AC&I
 - c. EC&R
 - d. RDT&E

E. HEADQUARTERS LOGISTICS MANAGEMENT DIVISION (G-ELM).

1. Describe the organizational structure of G-ELM.
2. What is the function and primary responsibility of the following branches:
 - a. G-ELM-1, Program Evaluation Branch
 - b. G-ELM-2, Supply Policy Branch
 - c. G-ELM-4, Information Resource Management Branch
 - d. G-ELM-5, Configuration Management Branch
3. Define and state the function of the following ELM initiatives:
 - a. Systems to Automate and Integrate Logistics (SAIL)
 - (1) Centralized Shipboard Supply (CSS)
 - (2) Large Unit Financial System (LUFS)
 - (3) Configuration Management (CM-PLUS)
 - (4) Shipboard Computer Aided Maintenance Program (SCAMP)
4. State the function of a Configuration Management Board.

F. COAST GUARD YARD

1. Describe the organizational structure of the CG Yard.
2. What is the function and primary responsibility of the following:
 - a. Industrial Department
 - b. Military Support Operations
 - c. Facilities Management
 - d. Fiscal Department
3. What magnitude of ship repair and construction is the CG Yard capable of undertaking?
4. Explain how the CG Yard can be awarded work without having to compete with commercial repair facilities.
5. What type of funds are appropriated for the CG Yard? Does G-ENE allocate funds to the Yard?

G. SUPPLY CENTER CURTIS BAY (SCCB).

1. Describe the organizational structure of SCCB.
2. What is the function and primary responsibility of the following divisions:
 - a. Resource Management
 - b. Material Management
 - c. Technical Support
3. How are shipboard allowances determined by the Supply Center?
4. What criteria is used to approve or disapprove Allowance Change Requests?
5. Explain how a parts requisition is processed and prepared for shipment.
6. Explain how the repair and return program is administered.
7. Define and state the purpose of the Automated Requisition Management System (ARMS).
8. Define Cutter Support Review (CSR).
9. What is a commodity management plan? How is it used?

SECTION 5102 - MAINTENANCE MANAGEMENT

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. MLCP and MLCA Standing and Operating Procedures
3. NWP 10-1-10, Operational Reports

B. SHIPALTS/BOATALTS/BARGEALTS.

1. What is the definition of a ShipAlt/BoatAlt/BargeAlt? How are ShipAlts/BoatAlts/BargeAlts classified and prioritized?
2. Who has final authorization on ShipAlt/BoatAlt/BargeAlt approval and implementation?
3. List the criteria used to classify and evaluate ShipAlt/BoatAlt/BargeAlt proposals.
4. What is the purpose of submitting a Configuration Change Request (OPNAV 4790CK)?
5. Is a Configuration Change Request (OPNAV 4790CK) required when a change proposal falls outside the definition of a ShipAlt/BoatAlt/BargeAlt?
6. Who is authorized to initiate a ShipAlt/BoatAlt/BargeAlt Request?
7. Explain the role and responsibilities of the following commands or units in the ShipAlt/BoatAlt/BargeAlt process:
 - a. Originator (cutter, group, NESU, etc.)
 - b. NESU/Group
 - c. Area/District
 - d. MLC
 - e. G-ENE, G-ELM, G-TEO, SCCB, G-NIO, G-OCU
 - f. Configuration Control Board
8. Explain the purpose of initiating a ShipAlt prototype. Are ShipAlt prototypes always required? Who is authorized to initiate a ShipAlt Prototype?
9. Explain the process for tracking ShipAlt status.

C. CURRENT SHIPS MAINTENANCE PROJECT (CSMP).

1. Define CSMP. How are CSMP files prepared and maintained?
2. Explain how CSMPs are initiated. What criteria is used in developing a good CSMP?
3. List the applicable reference documents used for preparing CSMPs.
4. Explain the role and responsibility of the following commands for approving, scheduling, and funding CSMPs:
 - a. Cutter
 - b. NESU/Group
 - c. MLC(vr), MLC(vs)
5. State why a CSMP may be disapproved.
6. How are Cost Estimates determined for a CSMP?
7. What is the criteria for determining whether AFC-30 or AFC-45 funds will be used on CSMPs?
8. How are CSMPs tracked?
9. How are CSMPs prepared for recurring work items?

D. CASREP.

1. Define CASREP. When are cutters required to submit a CASREP?
2. Explain the role and responsibility of the following commands and units in reporting, updating status, and responding to CASREPs:
 - a. Cutter
 - b. MLC
 - c. NESU
 - d. Operational Commander, Program Manager
 - e. SCCB
3. Explain how assistance is rendered to a cutter that is underway.

4. Explain how a cutter receives procurement support for a CASREP. How are CASREPs funded?
 5. How are CASREPs classified?
 6. How is outside assistance requested?
 7. How are CASREPs tracked?
 8. Explain how the CASREP System interfaces with:
 - a. SORTS
 - b. CALMS
 - c. Equipment Identification Code (EIC)
- E. PREVENTIVE MAINTENANCE SYSTEM (PMS)
1. Explain how to initiate a PMS Change Request.
 2. Explain how Maintenance Procedure Cards are developed and reviewed.
 3. Become proficient in the Maintenance Management functions of SCAMP.
 4. Explain how PMS scheduling intervals are determined.
 5. State the resources available to assist cutters in the completion of PMS? What are the procedures for requesting MAT assistance?

SECTION 5103 - REPAIR AVAILABILITIES

A. Reference Material.

1. Naval Engineering Manual, COMDTINST M9000.6
2. MLCP and MLCA Standing and Operating Procedures
3. NSTM Chapter 997

B. General.

1. Define Repair Availability. What is the difference between a Repair Availability and a Charlie Period? What is the difference between a dockside and drydock availability?
2. Explain the difference between service, ship repair, and procurement contracts.
3. List the governing documents and explain the process in which the Operational Commander and MLC schedule Repair Availabilities (Drydock and Dockside).

C. Availability Planning Schedule. The generation of a complete contract package for a commercial availability, or a work order package for an availability at a base, requires the timely execution of many separate tasks.

1. What is a Naval Engineering Cutter Material Assessment? When are Naval Engineering Cutter Material Assessments conducted?
2. How do Naval Engineering Cutter Material Assessments impact the development of the following:
 - a. CSMPs
 - b. Long Range Maintenance Plans
 - c. Naval Engineering Project Listing (NEPL)
 - d. Availability Worklist Specifications
 - e. Cutter Class Maintenance Plans
3. When are Acquisition Teams required to convene?
 - a. List the members for the A-Team and their respective responsibilities.
 - b. What is the goal of a First A-Team Meeting?
 - c. What is the goal of Second A-Team Meeting?

- d. What is the goal of a Third A-Team Meeting?
- 4. Who is responsible for generating the availability worklist?
- 5. How many weeks prior to an availability are units required to submit their Worklist Proposal (CSMP Package) to the MLC?
- 6. Although full and open competition is the desired approach for soliciting contracts, explain the procedures and requirements for geographically restricting cutter availabilities. When shall requests for geographic restrictions be submitted?
- 7. Who determines which Work Items will require AFC-30 or AFC-45 funding? What criteria is used?
- 8. To ensure that AFC-30 Work Items are included in the availability package, when are units or program managers required to transfer AFC-30 Funds to the MLC? What is the method of transferring funds to the MLC?
- 9. If the awarded bid price for an AFC-30 item exceeds the government estimate or if there is growth during the completion of those items, who is responsible for paying the difference?
- 10. Identify the responsibilities of the following parties in the review, preparation, draft, and generation of a final specification package and government estimate:
 - a. Unit/Group
 - b. NESU/EMD
 - c. MLC(vad), MLC(vr), MLC(vs), MLC(vpl), MLC(t)
 - d. A-Team
- 11. What events take place, and who is responsible for conducting the following:
 - a. Legal review of the specification package
 - b. Advertising in the Commerce Business Daily
 - c. Issuing IFB/RFP
 - d. Bid opening and evaluation
 - e. Pre-award survey
 - f. Contract award

12. What information are you allowed to provide a bidding contractor during a Bidder's Inspection?

D. Conducting The Availability.

1. What is the responsibility of the following during a repair availability?
 - a. Commanding Officer or Officer-in-Charge
 - b. NESU
 - c. MLC
 - d. Contractor
2. State the responsibility of the following positions:
 - a. Contracting Officer (KO)
 - b. NESU Representative
 - c. Contracting Officer's Representative (COR)
 - d. Engineer Officer
 - e. Damage Control Assistant
 - f. Primary Inspector
 - g. Dockmaster
 - h. Ship's Superintendent
3. Who is responsible for ordering and procuring AFC-30 GFE/GFM and AFC-45 GFE/GFM? Who is responsible for ensuring that the GFE/GFM is received, inventoried, and made available for contract start?
4. Explain the procedures and requirements for off-loading Fuel and Ammunition prior to an availability.
5. What is the purpose of conducting a Pre-Yard Availability Conference? Who is responsible for scheduling the conference? Who shall attend?
6. What is the purpose of conducting a Pre-Availability Safety Briefing? Who is responsible for scheduling the briefing? Who shall attend?
7. Who is responsible for inspecting drydocking blocks to ensure proper arrangement?

8. When shall the Underwater Body Inspection Board convene? Who are the members of the board?
9. What is the responsibility of a Contractor regarding fire prevention, watertight integrity, storm damage, and personnel safety while in drydock and during undocking. What is the responsibility of the Commanding Officer?
10. Explain the process for updating and revising the Docking Plan and Ship Drawings that are altered during repair availabilities.
11. What is the purpose of? Who is required to attend? How often are the following conferences convened?
 - a. Arrival Conference
 - b. Progress Conference
 - c. Drydocking Conference
12. State the Coast Guard's (Federal Government) position/policy regarding:
 - a. Contract Specification Clarification
 - b. Ship's Force Work during an availability
 - c. Employment of Cutter Personnel by Contractors
 - d. Gratuities
 - e. Labor Relations
13. State the purpose for maintaining the following records: Who is responsible for initiating these reports?
 - a. Progress Chart/Reports
 - b. Inspector's Work Log
 - c. Contract Deficiency Report
 - d. Condition Found Reports
 - e. Completion Report (Status Reports)
14. When and by whose authority can the Coast Guard stop work?
15. What are the requirements for signing for completed work? Who has sole authority for accepting completed work?

16. State the policy and process (required forms) for initiating, negotiating, and awarding the following contract changes/modifications. Who is authorized to make contract changes? What role does the Cutter's Program Manager, MLC(v), and the NESU have in making such a decision.
 - a. Optional Items
 - b. Growth Work
 - c. New Work
17. Can new work be awarded with the context of an original contract? How can a Contracting Officer justify growth work without re-advertising for full and open competition?
18. Who is responsible for injuries to Contracting Personnel that take place on a Coast Guard cutter during an availability?
19. Is the Coast Guard required to ensure that a Commercial Contractor is complying with local, state, and federal safety and environmental regulations? If so, what leverage does the Coast Guard have in enforcing compliance?
20. State the purpose for submitting the following correspondence (legal records and reports): What are the submission deadlines?
 - a. Departure Message
 - b. Final written Completion Report
 - c. Post Availability Report
 - d. Latent Defects Report (Warranty Item Report)
21. Define the procedures for updating ship drawings, whose contents have been effected by work undertaken during maintenance availabilities.

SECTION 5201 - REQUIRED TASKS

	SIGNATURE/DATE
A. MAINTENANCE AND LOGISTIC SUPPORT	
1. Coordinate and monitor Base Industrial and MAT/WAT work orders.	_____
a. Define Scope of Work	_____
b. Prepare Cost Estimate	_____
2. Evaluate (recommend approval or disapproval) the following and provide feedback to the originator:	
a. ShipAlt Request	_____
b. Idea Express	_____
c. PMS Change Request	_____
d. Tech Pub Update	_____
e. Cutter Engineering Report	_____
3. Respond to unit CASREPs. Coordinate logistic support and repairs.	_____
4. Screen, research, and endorse CSMPs. Determine funding using AFC-30/AFC-45 criteria.	_____
5. Participate in a Naval Engineering Cutter Material Assessment	_____
6. Develop and/or maintain Cutter Class and Long Range Maintenance Plans (CCMPs/LRMPs).	_____
7. Schedule and monitor PMS.	_____

B. REPAIR AVAILABILITY

1. Coordinate and manage a repair availability contract from the development of the Work List through the Completion of the Third A-Team Meeting. _____
- a. Develop a Repair Availability Worklist. _____
- b. Order, track, and QA GFE/GFM. _____
- c. Attend and participate as a member of the First A-Team Meeting. _____
- d. Assist in the development of a contract specification package. _____
- e. Attend and participate as a member of the Second A-Team Meeting. _____
- f. Assist in or conduct a Pre Award Survey and prepare the Pre Award Report. _____
- g. Schedule and Chair a Pre-Yard Availability Conference. _____
- h. Prior to docking a cutter, review the docking plan, check load calculations, and verify block location and construction. _____
- i. Attend and participate in the Arrival Conference. _____
- j. Serve as a member of a Underwater Body Inspection Board. _____

SIGNATURE/DATE

- k. Chair weekly Progress Conferences. Draft and process the following reports and forms: _____
- (1) Progress Reports
 - (2) Contractor Deficiency Report
 - (3) Inspector Reports
 - (4) Change Orders for Optional Items, Growth Work, and New Work
 - (5) Prepare a cost estimate
- l. Review and process Condition Found Reports. _____
- m. Draft and process Final Completion Report. _____
- n. Attend and participate as a member of the Third A-Team Meeting. _____

COMPLETION RECORD OF PART 5

FUNDAMENTALS

SIGNATURE/DATE

5101 Naval Engineering Support Organization

5102 Maintenance Management

5103 Repair Availabilities

PRACTICAL FACTORS

5201 Required Tasks

PART 6

SECTION 6101 - TECHNICAL AND CONTRACTING SCHOOLS

- A. Technical and contracting courses outlined within this section shall be completed as required by the EOIT's follow on tour Billet Description (i.e. NESU training billet, MLC staff assignment, etc.). While Part 6 is not required to be assigned as an EO, these courses may enhance an officer's competitiveness for assignment. Completion of these courses shall be documented on Form CG-4082, Officer Educational Record, and entered into the Officer's Personnel Record.

TECHNICAL AND CONTRACTING SCHOOLS

COURSE TITLE	SOURCE	LOCATION	DURATION	PHONE NUMBER
CONTRACT ADMINISTRATION	1. GSA	ATLANTA, GA BOSTON, MA CHICAGO, IL FT. WORTH, TX MINNEAPOLIS, MN SEATTLE, WA ST. LOUIS, MO WASHINGTON, D.C.	5 DAYS	(703) 557-0986
	2. MANAGEMENT CONCEPTS, INC.	VIENNA, VA DENVER, CO SEATTLE, WA PORTLAND, OR KANSAS CITY, MO CHICAGO, IL	5 DAYS	(703) 790-9595
	3. AMERICAN GRADUATE UNIVERSITY/ PROCUREMENT ASSOC.	ORLANDO, FL SAN FRANCISCO, CA WASHINGTON, D.C. SELF STUDY	4 DAYS	(818) 996-4576
ESTIMATING	1. AMERICAN GRADUATE UNIVERSITY/ PROCUREMENT ASSOC.	ORLANDO, FL SAN FRANCISCO, CA LOS ANGELES, CA SELF STUDY	5 DAYS	(818) 996-4576
	2. MANAGEMENT CONCEPTS, INC.	VIENNA, VA DENVER, CO	3 DAYS	(703) 790-9595
SPECIFICATION WRITING	1. SHIPLEY ASSOCIATES	VARIOUS	5 DAYS	(801) 295-2386
	2. MANAGEMENT CONCEPTS, INC.	VIENNA, VA DENVER, CO PORTLAND, OR CHICAGO, IL	3 DAYS	(703) 790-9595

TECHNICAL AND CONTRACTING SCHOOLS

COURSE TITLE	SOURCE	LOCATION	DURATION	PHONE NUMBER
COTR TRAINING	1. GSA	ATLANTA, GA	5 DAYS	(703) 557-0986
		CHICAGO, IL		
		DENVER, CO		
		NEW YORK, NY		
		PHILADELPHIA, PA		
		SAN FRANCISCO, CA		
		SEATTLE, WA		
		ST. LOUIS, MO		
		WASHINGTON, D.C.		
	2. MANAGEMENT CONCEPTS, INC.	VIENNA, VA	5 DAYS	(703) 790-9595
		DENVER, CO		
		BOSTON, MA		
		ATLANTA, GA		
		PORTLAND, OR		
	3. AMERICAN GRADUATE UNIVERSITY/ PROCUREMENT ASSOC.	CHICAGO, IL	3 DAYS	(818) 996-4576
		SAN FRANCISCO, CA		
		WASHINGTON, D.C.		
<hr/>				
CONTRACT QUALITY ASSURANCE				
	1. GSA	BOSTON, MA	3 DAYS	(703) 557-0986
		CHICAGO, IL		
		DENVER, CO		
		KANSAS CITY, MO		
		NEW YORK, NY		
		SAN FRANCISCO, CA		
		WASHINGTON, D.C.		
<hr/>				
WELD INSPECTION	1. USA MATERIAL TECH LAB	ON THE ROAD ONLY	5 DAYS	(203) 822-8335
	2. ABS	PARAMUS, NJ	5 DAYS	(212) 839-5000
	3. AMERICAN WELDING SOCIETY	BOSTON, MA	3 DAYS	1-800-433-9353

TECHNICAL AND CONTRACTING SCHOOLS

COURSE TITLE	SOURCE	LOCATION	DURATION	PHONE NUMBER
NDT TECHNIQUES	1. USA MATERIAL TECH LAB	WATERTOWN, MA	5 DAYS	(617) 923-5344
	2. NAVY			(718) 876-6340
	3. HOBART INSTITUTE	TROY, OH		(513) 332-5215
	4. AMERICAN WELDING SOCIETY	BALTIMORE, MD PHOENIX, AZ PORTLAND, OR MILWAUKEE, WI		1-800-433-9353
SURFACE PREPARATION & PRESERVATION	1. SPCC	VARIOUS		(412) 268-3326
	2. VIDEO/SPCC			
DOCKMASTER TRAINING	1. CRANDELL DRYDOCK ENGINEERS	DEDHAM, MA	4 DAYS	(671) 329-3240
SHAFT ALIGNMENT	1. NAVSSES	PHILADELPHIA, PA	3 DAYS	
CONTRACT CHANGES AND MODIFICATIONS	1. AMERICAN GRADUATE UNIV/ PROCUREMENT ASSOC.	VARIOUS	2 DAYS	(818) 996-4576

TECHNICAL AND CONTRACTING SCHOOLS

COURSE TITLE	SOURCE	LOCATION	DURATION	PHONE NUMBER
EVALUATING CONTRACTORS AND PERFORMANCE	1. MANAGEMENT CONCEPTS, INC	VIENNA, VA DENVER, CO	3 DAYS	(703) 790-9595
	2. GSA	ATLANTA, GA BOSTON, MA CHICAGO, IL DENVER, CO KANSAS CITY, MO PHILADELPHIA, PA SEATTLE, WA WASHINGTON, D.C.	5 DAYS	(703) 557-0986
NEGOTIATION OF CONTRACTS AND SUBCONTRACTS	1. AMERICAN GRADUATE UNIVERSITY/ PROCUREMENT ASSOC.	SAN FRANCISCO, CA WASHINGTON, D.C. SELF-STUDY	3 DAYS	(818) 996-4576
	2. MANAGEMENT CONCEPTS, INC.	VIENNA, VA DENVER, CO OKLAHOMA CITY, OK PHOENIX, AZ SAN FRANCISCO, CA	5 DAYS	(703) 790-9595
	3. GSA	ATLANTA, GA FT. WORTH, TX KANSAS CITY, MO NEW YORK, NY PHILADELPHIA, PA SEATTLE, WA ST. LOUIS, MO WASHINGTON, D.C.	5 DAYS	(703) 557-0986
VISUAL WELD INSPECTION	1. HOBART INSTITUTE OF WELDING TECHNOLOGY	TROY, OH	3 DAYS	(513) 332-5215
	2. AMERICAN WELDING SOCIETY	BOSTON, MA	1 DAY	1-800-443-9353

PART 7

SECTION 7101 - PEO TRAINING REFRESHER COURSE

To be developed per attached charter.



MEMORANDUM

Subject: REVISION A TO COMDTINST M3502.11

Date: JUN 16 1993
1550.7

From: Chief, Performance Systems Division

Reply to: G-PRF-2
Attn of: J. MARKOWITZ
7-2437

To: Chief, Naval Engineering Division

Ref: (a) Concurrent Clearance: Revision A to COMDTINST M3502.11 of 14 May 93
(b) CG RESTRACEN ltr 1550.7 of 4 May 93
(c) PHONCONS LCDR Hood (RTC t-ew), CDR Burson (NESU Boston), Mr.
Markowitz (COMDT G-PRF) on 3, 4 Jun 93

1. Enclosure (1) is submitted for inclusion in Part 7, reference (a) as the charter for the standing Natural Work Group (NWG) that would focus on Prospective Engineer Officer (PEO) training. Changes/additions from the initial draft (references (a) and (b)) are underlined in boldface.
2. We are optimistic that the Work Group will have a positive impact on training Engineer Officers. The G-PRF point of contact is Mr. Markowitz at 7-2437 whenever you have concerns, questions, or need more information.

G. L. SHAW

Encl: (1) NWG charter on Prospective Engineer Officer (PEO) training

Copy: G-ELM
RTC (t-ew)

CHARTER

PROSPECTIVE ENGINEER OFFICER (PEO) TRAINING REFRESHER WORK GROUP

PURPOSE: To identify and keep current the tasks to successfully perform as an Engineer Officer. From these tasks, determine which ones should be presented in a PEO Training Refresher course **and which tasks should be presented by job aid or on-the-job training (OJT)**. The PEO Training Refresher course will become required pipeline training for all PEOs similar to the requirement for all PCO/PXOs to attend their appropriate PCO/PXO refresher courses.

BACKGROUND: In February 1992, a study group was commissioned to review the curriculum of the Engineer Officer (EO)/Main Propulsion Assistant (MPA) Indoctrination course (EO-16). The study group concluded that the EO-16 course should be cancelled. Shortly after the study group completed their work, COMDT (G-ENE) developed and administered a survey pertaining to the EO-16 course. COMDT (G-ENE) targeted mainly EOs and a few MPAs. The results of the survey revealed the EO-16 course was not meeting the field's needs. The field recommended the course be modified greatly or cancelled. From both the study group and field survey, the major problem of the EO-16 course is keeping current on such topics as shipboard safety, refresher training, Supply Center policies, ship stability, financial management, cutter maintenance programs and other naval engineering programs. In **March 1993**, the Naval Engineering Training and Education Working Group recommended the EO-16 course be upgraded to a PEO course and a standing work group be established to oversee the course.

GROUP STRUCTURE: COMDT (G-PRF) will serve as the chartering entity for this multi-unit work group and provide membership on the Guidance Team.

COMDT (G-ENE) will also serve as the entity that makes the final determination on how well the PEO course, and any job aids and OJT that are developed, meet programmatic and field needs.

The Work Group will be composed of the Chief, Engineering and Weapons Branch, CG RESTRACEN, as the group leader. Other members will be knowledgeable, experienced personnel who will be drawn from CG MLCLANT, CG MLCPAC, Naval Engineering Support Unit (NESU) and COMDT (G-PRF, G-ENE, **G-PO**). The group leader may request adjunct members from CG SUPCEN, Curtis Bay, CG Electronic Maintenance Detachment, Navy Afloat Training Group, and sitting EOs.

ENCLOSURE (1)

The Guidance Team will be chaired by the Chief, Performance Systems Division (G-PRF) and will include the Chief, Naval Engineering Division (G-ENE), Chief, Logistics Management Division (G-ELM), Chief, Naval Engineering Division Atlantic (MLCAv), and Chief, Naval Engineering Division Pacific (MLCPv). **The Guidance Team shall be provide support to the work group in terms of facilitation and advice on programmatic policy and functional matters related to the topic under study. The Guidance Team will also determine the validity of the Work Group's recommendation on resources. COMDT (G-ENE) and G-PRF, as the program and training managers, will also seek to provide the validated resources.**

TASKING: The Work Group will:

1. Meet once a year and
 - a. **Determine, by reviewing or revising, all the tasks performed by an Engineer Officer.**
 - b. **Determine which tasks should be in the PEO course and those that should be in a job aid.**
 - c. **Determine how well the PEO course is meeting field needs from external (field) evaluations and other feedback.**
2. Ensure the revised task list for the PEO course **and job aids, and revisions are forwarded to the Guidance Team for review and approval prior to sending them to the Chief, Engineering and Weapons Branch, CG RESTRACEN for incorporation into the PEO curriculum outline, course, and job aids.**

FUNDING: **Funding for the work group's activities including TAD will be provided by COMDT (G-ENE).**

APPENDIX

3502

From: Commanding Officer, USCGC _____

To: ENS I. M. Done, 123 45 6789, USCG

Subj: COMPLETION OF PARTS 1 - 40 TO THE ENGINEER OFFICER IN TRAINING
(EOIT) PROGRAM

Ref: (a) COMDTINST M3502.11A, Engineer Officer in Training (EOIT) Program Personnel
Qualification Standard
(b) COMDTINST M3502.4C, Cutter Training and Qualification Manual
(c) COMDTINST M5000.3A, Coast Guard Regulations

1. Per reference (a) and (b), and having successfully completed Parts 1 - 4 of the EOIT program, I hereby certify you as an Assistant to the Engineer Officer, as defined by reference (c), while assigned to USCGC _____. A copy of your inport and underway EOW qualification letters and completion record sheets for Parts 1 - 4 are attached as enclosure (1).

2. Specific examples of your performance are (list specific accomplishments during the training period.)

3. A copy of this record will be included in your official record.

I. M. CO

Copy: COMDT (G-PO)
PERSRU

Encl: (1) Qualification and Completion Records

From: Commanding Officer, USCGC _____

To: ENS I. M. DONE, 123 45 6789, USCG

Subj: COMPLETION OF PART 5 TO THE ENGINEER OFFICER IN TRAINING (EOIT)
PROGRAM

Ref: (a) COMDTINST M3502.11A, Engineer Officer in Training (EOIT) Program Personnel
Qualification Standard
(b) COMDTINST M3502.4C, Cutter Training and Qualification Manual

1. I hereby certify you as having completed Part 5 of the EOIT program as defined by
references (a) and (b). A copy of your completion record sheet for Part 5 is attached as enclosure
(1).

2. A copy of this record will be included in your official record.

I. M. CO

Copy: COMDT (G-PO)
PERSRU

Encl: (1) Part 5 Completion Record